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Gas Journal

Vol. 248. 98th Year. LONDON, JULY 3, 1946. No. 4337. Price 1/-

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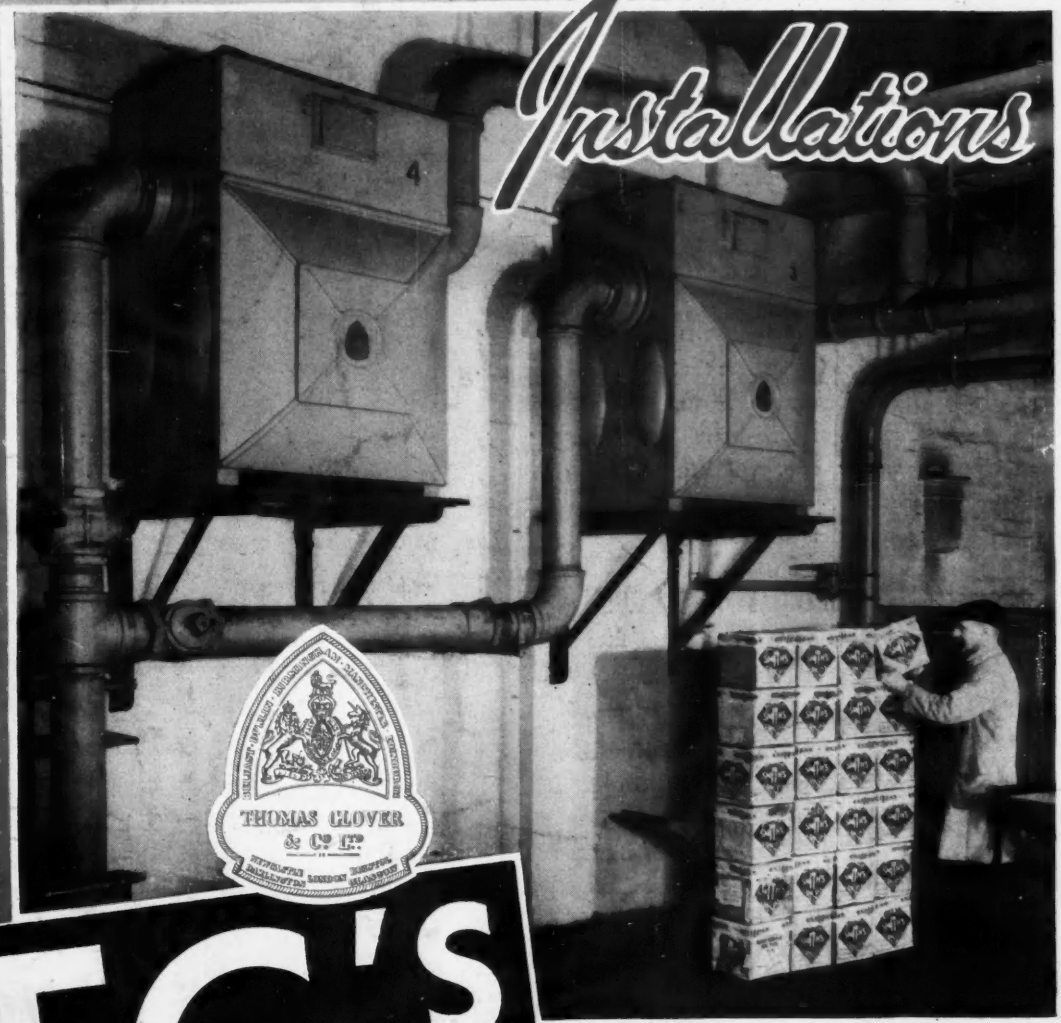
Installations



THOMAS GLOVER & Co Ltd

T.G.'s

GAS METERS

THOMAS GLOVER & CO. LTD

EDMONTON · LONDON N·18 & BRANCHES

√R v.248 July-Dec 1946

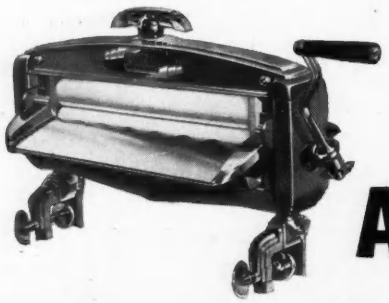
It goes without saying a washing machine fitted with an Acme is good

IT HAS BEEN PROVED by long and sound experience in the past that the Acme Cleanser-Wringer is the foremost of its kind. When a woman in pre-war days talked of a wringer, she *meant* an Acme. When in the coming days of peace she will talk of wringers she will again mean an Acme. To her in the future, as in the past, the Acme will stand as the ideal machine for work in the home laundry. So that when she sees a washing machine fitted with an Acme 55 she will say to herself—"That's a good washing machine".

Your experience tallies with that of the housewife. You know of old the perfect workmanship of the Acme—the points about it which always made it the best cleanser-wringer procurable. The reversible handle, easily used, easily unscrewed and folded back when not in use. The two-way drain, which allows the housewife to drain the flow whichever way she wants it to go. The twin folding boards. The rustless bearings. The way in which perfect results are insured by scientifically applied pressure, which forces out the last clinging particle of soap scum and dirt.

After the war you will be stocking up again with all the good, essential products of a worthwhile peace. Among them washing machines. You know that your customer will look for the sign that a washing machine is good. You will say, "Yes, it's fitted with an Acme". There will be no need for discussion. You and she, partners in experience, know that that *is* the sign. The Acme always was—will be again—the soundest, finest rubber-roller wringer on the market.

ACME WRINGERS LTD · DAVID STREET · GLASGOW · S·E



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GAS JOURNAL, JULY 3, 1946
VOL. 248 98th YEAR No. 4337

How employers can find the right executives

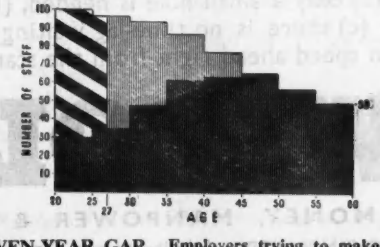
MANY employers will remember the tragic waste of talent and ability that resulted from the scramble for employment after the 1914-18 war.

But this time the Government has taken steps to see that talent and ability are not wasted. A free, nation-wide appointments service makes it easy for employers to select just the men and women they need for executive, managerial or administrative posts.

Among the thousands now being released every week from the Forces or from war industry are numbers of qualified and experienced men and women with the capacity for responsible jobs. And with them, younger men of high promise—often with little or no pre-war experience of business or industry, but with qualities of initiative and judgment developed and tested in the Forces.

MATCHING MEN WITH JOBS

The service works through thirteen Regional Appointments Offices, where candidates for responsible posts—men and women from civilian employment as well as from the Services—are interviewed, classified and registered. All who are without previous experience in their chosen field are assessed and "screened" by modern, tested methods to discover their special aptitudes and potentialities.



THE SEVEN-YEAR GAP. Employers trying to make up for the lost years, when they could not recruit promising young men to train for executive jobs, are finding the Appointments Offices a valuable source of "material."

The above chart represents the staff structure of a typical engineering firm. In grey: men called away. In black: the war-time staff, reserved or unfit. In stripes: the 20-27 age gap now left, even after reinstatement of pre-war employees.

Unfilled, this gap will mean a dangerous staff shortage, in ten years' time, of the 30-37's; in twenty years' time, of the 40-47's. It can be filled only by men between 20 and 27 returning to civil life. Most of those of executive calibre are applying, on release, to the Appointments Offices. That is where employers are finding the talent they want.

The result is that the employer seeking a man to fill a certain post—or to train for it—can draw on the whole country if need be; and he is spared many useless interviews, since suitable candidates *only* are submitted for his choice.

The purpose of the Appointments Offices is NOT to find jobs for all applicants, regardless of ability; but to see that those who have ability get the chance to show it, and to offer employers the choice of the best men available for responsible posts.

Since VE-day, more than 30,000 responsible positions have thus been successfully filled. Whatever your needs for experienced or potential executives, you would be well advised to get in touch with your Regional Appointments Office.

Most probably the man you are seeking is already on the register of one of the Appointments Offices—or will be when his release group is reached. In any case the Appointments Offices will spare no efforts to help you find him.

TRAINING SCHEMES

Even if your need for staff is still some months ahead, you will be interested in the training schemes by which promising candidates are being assisted to complete their professional or technical education, or to take courses in business administration.

Write, telephone or call. The Regional Appointments Offices are in the following towns:—

LONDON: 1-6 Tavistock Square, W.C.1
CAMBRIDGE: 5 Salisbury Villas, Station Road
READING: 23 Valpy Street
BRISTOL: Lyndale Hotel, Berkeley Square
BIRMINGHAM: 239 Broad Street
NOTTINGHAM: Commerce Chambers, Upper Parliament Street
LEEDS: Greek Street Chambers, Greek Street
MANCHESTER: Commercial Chambers, 47 Corporation Street
LIVERPOOL: Cotton Exchange, Bixteth Street
NEWCASTLE-ON-TYNE: 153 Barras Bridge
EDINBURGH: 5 Rothesay Terrace
GLASGOW: 450 Sauchiehall Street
CARDIFF: 8 Cathedral Road

A General Manager's Appreciation

The following extract from a letter written by the General Manager of a large engineering works is typical of scores of expressions of appreciation received:

"All the six applicants whose names you sent to me were interviewed. May I say that I was impressed by the consistent high standard of the applicants, and that it was with very great difficulty that a choice was made."

Issued by the Appointments Department, Ministry of Labour and National Service, St. James's Square, London, S.W.1

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PERMANENT REPAIRS TO BUNKERS AND ALL CONCRETE OR STEEL STRUCTURES

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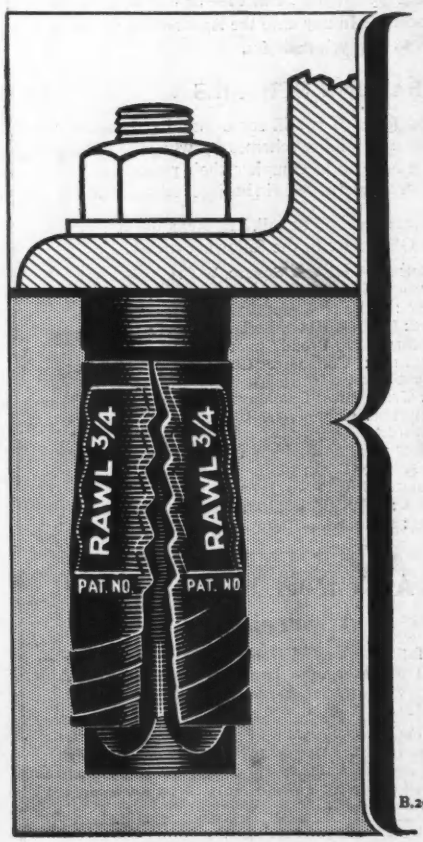
THE CEMENTATION COMPANY LTD.

39, VICTORIA STREET, S.W.1. BENTLEY WORKS, DONCASTER



Every Blue-print and every Plan should specify RAWLBOLTS for Heavy Fixings . . .

This definite statement is made because millions of RAWLBOLT fixings have conclusively proved their worth. If you make heavy fixings with RAWLBOLTS you save time, manpower and money, because (a) only a small hole is needed, (b) no grouting is necessary and (c) there is no time-lag waiting for cement to dry. The job can speed ahead right from the start.

RAWLBOLTS

SAVE TIME, MONEY, MANPOWER & MATERIAL

PLANT REPLANNING SIMPLIFIED. Architects and Draughtsmen are continually being consulted regarding replanning to cope with changing production demands. Every job can be speeded up by making light fixings with RAWLPLUGS and heavier fixings with RAWLBOLTS . . . . Instead of inserting on your specification "fix and make firm," *definitely specify* the use of RAWLPLUGS and RAWLBOLTS for all fixings . . . . the saving in time and manpower will be automatic.

THIS DIAGRAM IS TYPICALLY ILLUSTRATIVE OF A RAWLBOLT FIXING.
The general principle may be applied to items of equipment such as steel or cast iron flues and chimneys, air-filters, air-washers, instrument and gauge boards, heavy machinery, power transmission, wiring, etc., etc.

B.298

WRITE FOR TECHNICAL LITERATURE

Rawlplugs, Rawldrills, Rawlbolts, Percussion Tools, Rawlplastic, White Bronze Plugs, Bolt Anchors, Screw Anchors, Cement in Sockets, Boring Tools, Tile Drills, Electric Hammers, Mechanical Hammers, Soldering Irons, Toggle Bolts and many products of Industrial and Domestic utility.

The world's Largest Manufacturers of Fixing Devices.

THE RAWLPLUG CO. LTD., CROMWELL ROAD, LONDON, S.W.7

Water

WITHOUT ITS TROUBLES

Water to cool and scrub gas, and for by-product condensers (as most of us know only too well) contains trouble in the shape of dissolved salts which tend to precipitate under the influence of heat or alkalis. This leads to scale formation, resulting in inefficiency and high cleaning costs. But this precipitation need not occur. Minute quantities of sodium metaphosphate (Calgon*) added to the water—a few parts per million—can prevent the trouble.

Albright & Wilson maintain a Technical Service to advise on water treatment problems, which includes analysis of water and recommendations on dosage quantities.

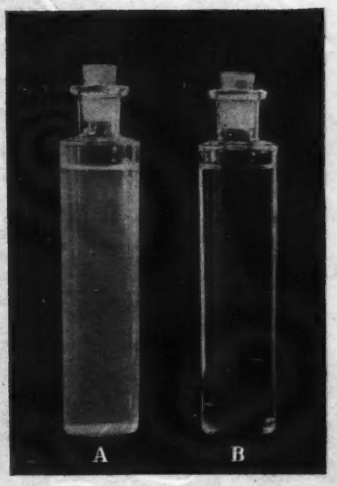
A SIMPLE TEST SHOWING THE EFFECT OF CALGON

The water in each of the two bottles illustrated contains 200 parts per million of calcium bicarbonate. 2 p.p.m. of Calgon were added to B and then 300 p.p.m. of soda ash to each bottle.

A. Became cloudy within 5 minutes, as a result of calcium carbonate being precipitated.

B. With Calgon, showed no precipitation after 24 hours.

Precipitation of calcium carbonate by heat can be demonstrated in a similar manner.



* Calgon is the registered trade name of Albright & Wilson's Sodium Metaphosphate.

ALBRIGHT & WILSON LTD

(Incorporating Keith Piercy Ltd)

Water Treatment Department

49 PARK LANE, LONDON, W.1 . WORKS: OLDBURY & WIDNES

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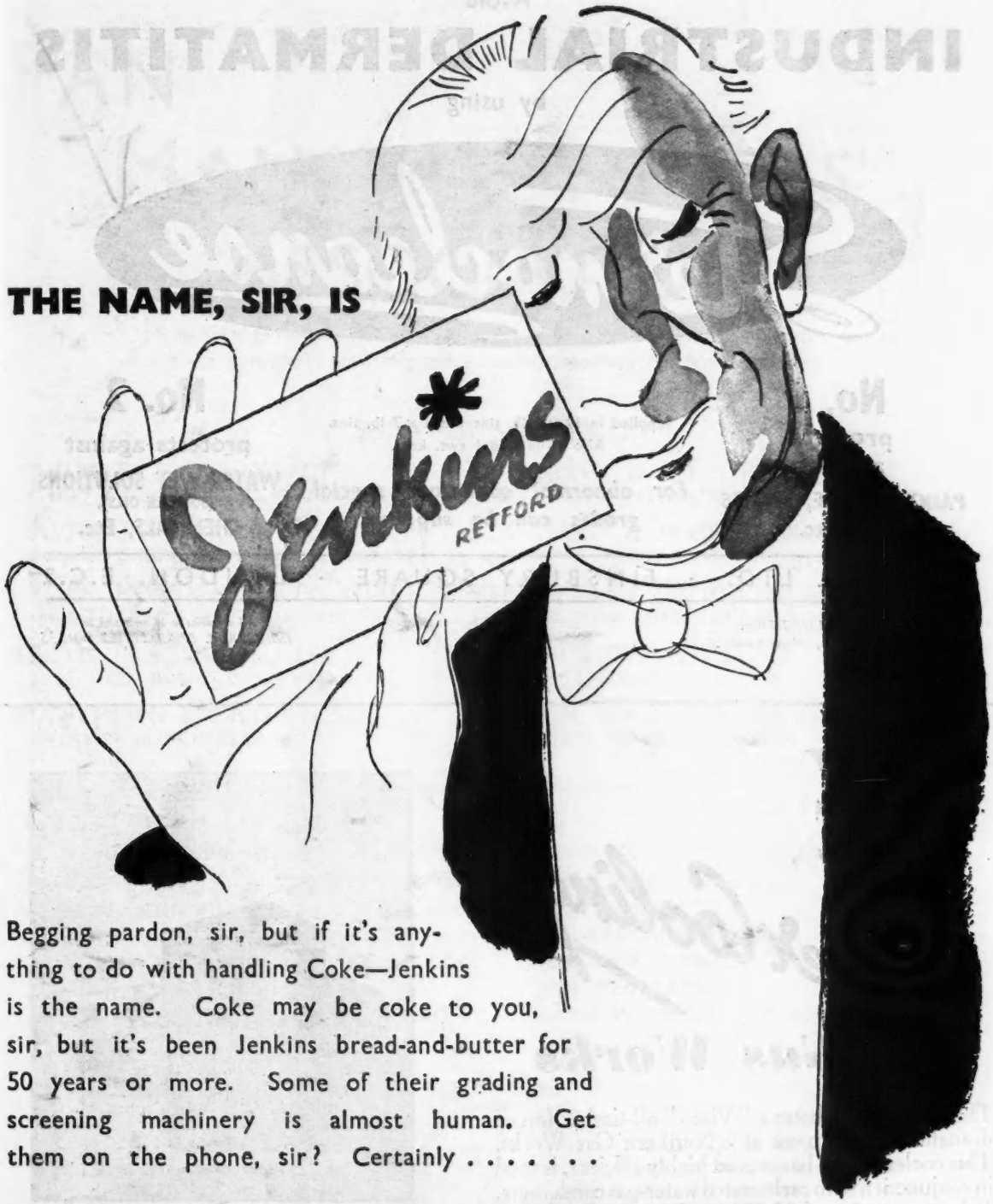
SUGG
WESTMINSTER

A name that Guarantees quality and efficiency

TEL: VIC 3211

PROGRESSIVELY PLANNED PUBLIC LIGHTING

THE NAME, SIR, IS



Begging pardon, sir, but if it's anything to do with handling Coke—Jenkins is the name. Coke may be coke to you, sir, but it's been Jenkins bread-and-butter for 50 years or more. Some of their grading and screening machinery is almost human. Get them on the phone, sir? Certainly . . . . . .

***SPECIALISTS IN COKE GRADING AND SCREENING**

Avoid

INDUSTRIAL DERMATITIS

by using

Sternocleanse

No. 1
protects against
PAINT, GREASE, SPIRITS OIL, Etc.

Supplied in 12 × 2 lb. tins and 6 × 7 lb. tins.
Also 28 lb. and 1 cwt. kegs.

For abnormal conditions special grades can be supplied.

No. 2
protects against
WATER-WET SOLUTIONS (SOLUBLE OILS), CHEMICALS, Etc.

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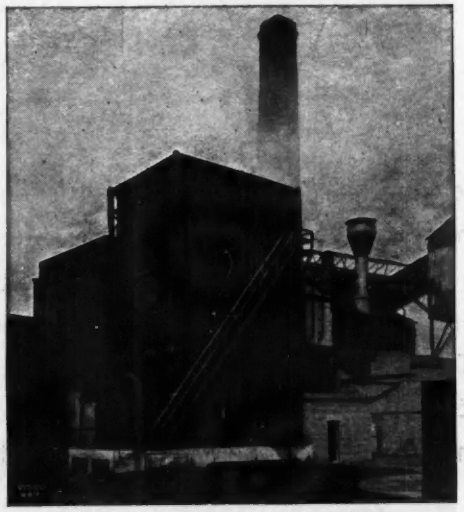
Telephone: MONarch 3871-2-3-4-5.
Telegrams: "Sternoline, 'Phone, London."

All enquiries to be addressed to INDUSTRIAL SPECIALITIES Dept. 35

VEC

Water Cooling for Gas Works

The illustration shows a "Visco" all-timber forced draught cooling tower at a Northern Gas Works. This cooler, which has proved highly efficient, is used in conjunction with carburetted water-gas condensers. It has a capacity of 15,000 g.p.h. and is typical of many supplied to Gas Companies, Collieries and Industrial Plants.



Whatever your requirements, we can supply suitable equipment. We have designs ranging from a few hundred gallons to over a million gallons per hour.

Consult us on your water cooling and oil cooling problems.

ALSO MAKERS OF AIR FILTERS, DUST COLLECTING PLANT.

VISCO
ENGINEERING CO LTD
STAFFORD ROAD, CROYDON.

Telephone: Croydon 4181-4 and 2471.
Telegrams: "Curtmit, Croydon."

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ITS INDIVIDUAL MEMBERS ARE MANUFACTURERS AND SPECIALISTS IN ALL BRANCHES OF FAN ENGINEERING SUCH AS :—

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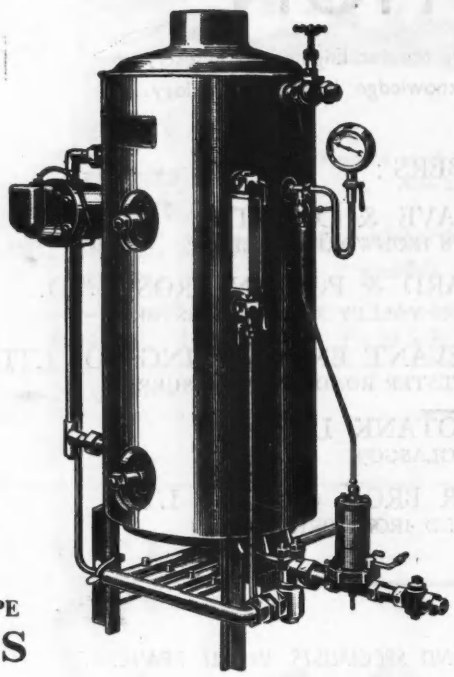
BROCKHOUSE

Gas-Fired STEAM BOILERS



TYPE
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The Brockhouse Gas-fired Steam Boiler represents the most modern equipment for steam heating and industrial processes. Designed to give long life, the boiler is of all-steel construction with riveted side and end plates.

Suitable for working pressures up to 100 lb. per sq. in. gauge, it is available in a standard range of sizes from 30 lb. to 310 lb. steam per hour.

The Brockhouse Automatic Condensate Return System can be supplied complete with drawing, wiring diagram and fixing details, ready for connection to steam condensate mains to give fully automatic control combined with economy and efficiency.

Full details and schemes on request from our Technical Advisory Service Department.

BROCKHOUSE HEATER CO. LTD.
VICTORIA WORKS, WEST BROMWICH
Telephone: WEDNESBURY 0243

LONDON OFFICE:
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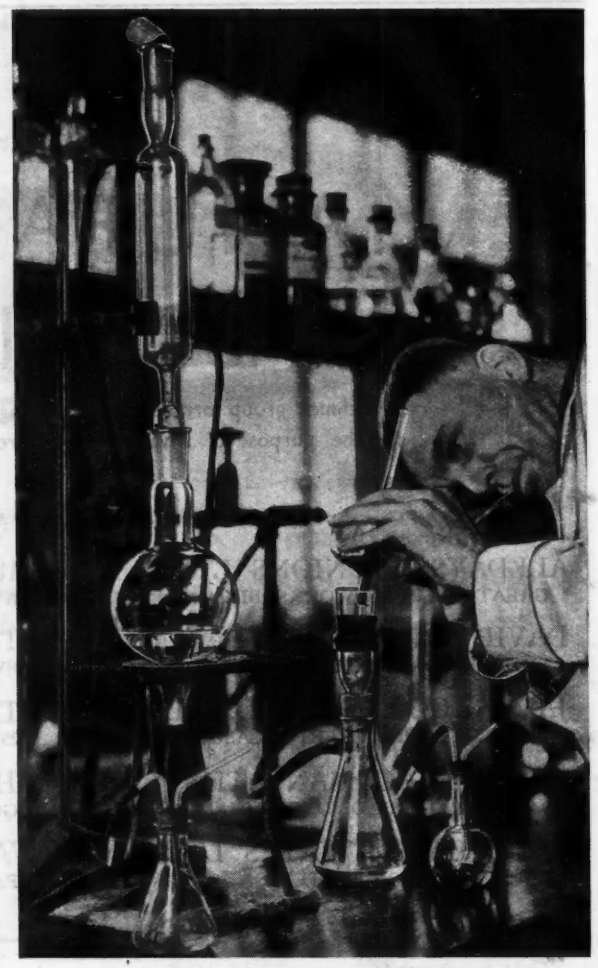


Important Tests that control production.

THE maintenance of the high unvarying standard of quality in PYREX Brand Scientific Glassware is so vital to efficiency in the finished product, that frequent routine tests are made to ensure the closest relation to the established formula. Here two tests are seen in progress.

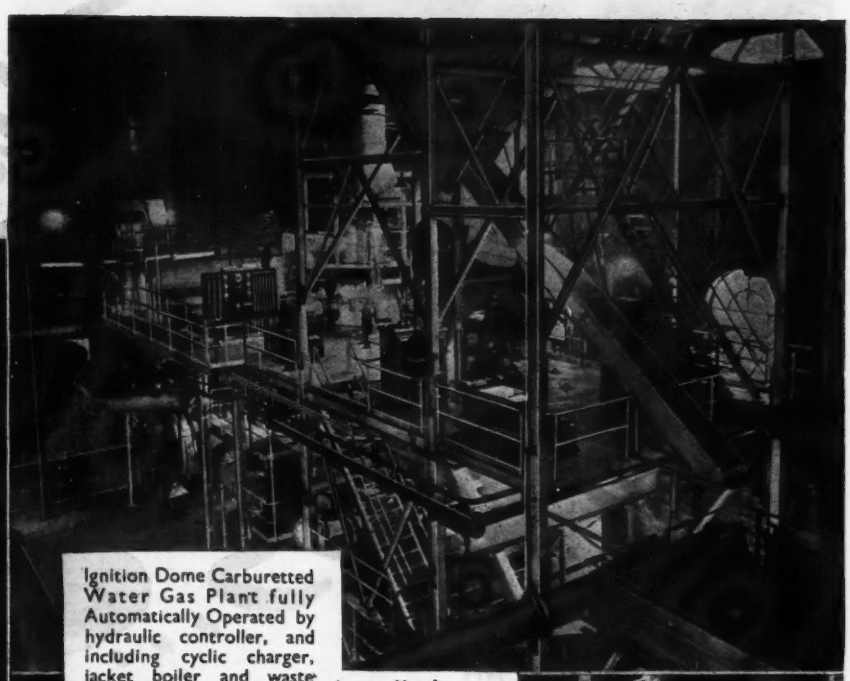
(A) On the left is the Boric Oxide test, or the es mation of Boric Oxide (B_2O_3) in PYREX Brand Glass, B_2O_3 being one of the most impor ant constituents in this famous Boro-silicate glass.

(B) On the right, one of our research chemists is estimating the amount of Sodium Oxide (Na_2O) by Zinc-uranyl-acetate, a rapid and extremely accurate method of controlling the Sodium Oxide in in PYREX Brand Glass, the Na_2O content being extremely important to the physical property of the glass, especially the co-efficient of expansion.

That's why you can always rely on

PYREX
REGD TRADE MARK BRAND
SCIENTIFIC GLASSWARE.
MADE BY
JAMES A. JOBLING & CO. LTD.,
Wear Glass Works, SUNDERLAND.

T.50.A.



Ignition Dome Carburetted Water Gas Plant fully Automatically Operated by hydraulic controller, and including cyclic charger, jacket boiler and waste heat boiler

Installed at:
LOWER SYDENHAM GAS WORKS of the SOUTH SUBURBAN GAS COMPANY

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SPECIALISTS IN DESIGN AND CONSTRUCTION OF PLANTS FOR THE PRODUCTION, COOLING CLEANING & PURIFICATION OF INDUSTRIAL GASES

WATER-GAS
(Blue and Carburetted)

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(From Coal, Coke, Anthracite, etc.)

HYDROGEN
(By Steam-Iron or Catalytic Processes)

CARBON MONOXIDE

CARBON DIOXIDE

THE POWER-GAS CORPORATION LIMITED

STOCKTON - ON - TEES

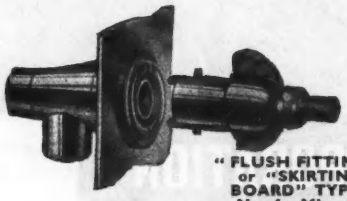
AND LONDON, AUSTRALIA, CANADA, INDIA, SOUTH AFRICA

Plug in to GAS...

"ORDINARY" TYPE
No. 1. Mk. II.
Socket screwed ½in. B.S.P.
Nose piece of Plug screwed ½in. B.S.P.

"PEDESTAL" TYPE
No. 2. Mk. II.
With Flange for floor fixing
Socket screwed ½in. B.S.P.
Nose piece of plug screwed ½in. B.S.P.

"PEDESTAL" TYPE
with stem cock.
No. 3. M. II.
This only differs from No. 2. in that the stem cock is added.



"FLUSH FITTING" or "SKIRTING BOARD" TYPE.
No. 4. Mk. II.
This type has heavy brass plate 4 ins. long and 3 ins. wide with holes in corners for fixing screws.
Socket screwed ½in. B.S.P.
Nose piece of plug screwed ½in. B.S.P.

"THROUGH" TYPE
No. 5. Mk. II.
Socket screwed in ½in. B.S.P. M. & F. Threads.
Nose piece of plug screwed ½in. B.S.P.

Gas automatically turned on

THE ever growing use of gas appliances, both in the home and industry, makes it essential that it should be possible to change them from point to point, easily and safely.

Edgar Flexible Plugs and Sockets are specially designed for this purpose, and being instantaneous in use, are a perfect safeguard against the accidental or careless turning on of the gas.

The neat design of the various types permit gas points to be installed in the most convenient places, unobtrusively and efficiently.

With Edgar Flexible Plugs and Sockets the connecting of a gas fire, poker, iron, blow lamp, or boiler, etc., is a simple one-handed job. Merely insert plug into socket, give a quarter turn and the gas is instantaneously turned on.

In all new buildings specify

EDGAR

FLEXIBLE PLUGS AND SOCKETS

WM. EDGAR & SON, LTD.

BLENHEIM WORKS, HAMMERSMITH, LONDON, W.6.

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FOR SEVERELY CORROSIVE CONDITIONS...

"BITUMASTIC"

SUPER SERVICE BLACK

THREE TIMES AS THICK AS ANY ORDINARY BITUMINOUS PAINT

The services of our enlarged Contract Department are now available to customers in any part of the country for the actual application of our products. Enquiries are invited. Please mention Dept. L.2.

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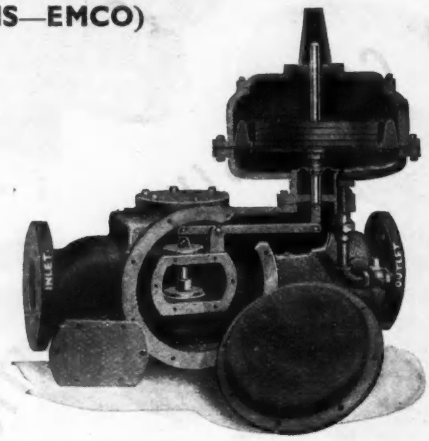
HIGH PRESSURE DISTRICT GOVERNORS

(JEAVONS—EMCO)



- Is of simple design having no exposed parts.
- Positive action under all conditions.
- Used extensively at home and abroad.
- Readily accessible and interchangeable valve unit facilitates a considerable saving in maintenance time.
- Emcoloader Patent Automatic Boosting Device can be supplied with this Governor.
- Easily fitted with Pilot Control.

Inlet Pressure 1 to 100 lbs.

Outlet Pressure 4" W.G. upwards.

Sizes :— 2" TO 12"

JEAVONS ENGINEERING Cº
TIPTON - STAFFS

GRAMS.—"PIPELINES" TEL.: TIP 1621 (3 lines)

COOKING PRE-VIEW

The glass door of the VULCAN has always been a popular selling point. What of the future? New VULCAN models will stimulate demand and delight your customers with their even greater efficiency, simplicity and beauty. Whatever your customers' wants, you'll find a VULCAN fits in with them.

Type illustrated: Stream-lined cabinet, closing cover top, patent insulated non-steaming glass door, Vulcan Regulator automatic oven heat control, efficient burner planning, porcelain enamel finish.

VULCAN STOVES

THE VULCAN STOVE CO. LTD., EXETER V.12

A particularly interesting bracket clock (circa AD 1690) by Thomas Tompion, the father of English clockmaking, several of whose timepieces are still in service at Buckingham Palace. From the celebrated collection of Percy Webster, Queen Street, Mayfair, London.

Founded in 1810, Balfours of Leven have grown steadily with the Gas Industry, playing an increasingly important part in the development of new and more economical plant for the manufacture, purification and storage of gas, and the recovery and processing of by-products. The Balfour reputation for craftsmanship, acquired by long years of experience and jealously handed down from generation to generation, is now—as always—at the service of the Industry to assist in all problems concerning gas plant.

BALFOURS OF LEVEN ARE SPECIALISTS IN:—

- ★ Gas Works Plant
- ★ Coke Oven and By-Product Recovery Plant
- ★ Producer Gas and Water Gas Plant
- ★ Samka Heat Transfer Vessels and Equipment
- ★ Special Castings in Iron and Alloys
- ★ Welded and Riveted Work

BL1021-A1

HENRY BALFOUR & Co LTD

Gas Engineers & Ironfounders

SINCE 1810

Durie Foundry, Leven, Fife Leven 79 London Office—Artillery House, Westminster, London, S.W.1 ABBey 2121

TYPE 141——

SINGLE COLUMN GAUGES

FOR PRESSURE — DRAUGHT — DIFFERENTIAL

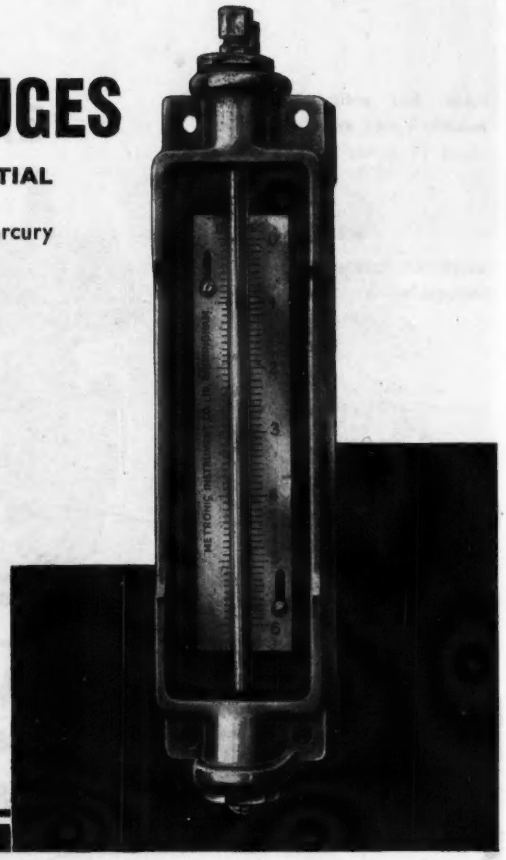
RANGES: 0–1" Water **TO** 0–36" Mercury

One-piece polished Aluminium castings with integral reservoir and trap. Pressure tested to 150-lbs. (air). Glass tube held in screwed glands. Scales mechanically engraved on metal, bakelite, ivorine, etc. Easily fixed—easily filled—easily read.

The Inclined model for low pressure and differential applications is available with magnifications up to 18:1. It is ideal for checking gas flow, fan pull, pressure drop, etc.

These gauges are used by leading gasworks and industrial gas consumers throughout the country, for both outdoor and indoor measurements. They are permanent, robust, accurate, and may be mounted singly or in batteries. Ask for leaflet.

REMINDER: The Metronic range also includes Edgewise Indicators and Circular Chart Recorders for all gas and liquid flow and pressure.



METRONIC INSTRUMENT CO. LTD.
196, GROVE LANE, SMETHWICK, STAFFS.

GEORGE GLOVER'S TWO-V-COIN

SMALL HIGH-CAPACITY PRE-PAYMENT METERS

Dependable Year-in Year-out

Ranelagh Works CHELSEA S·W·3 122, King's Road

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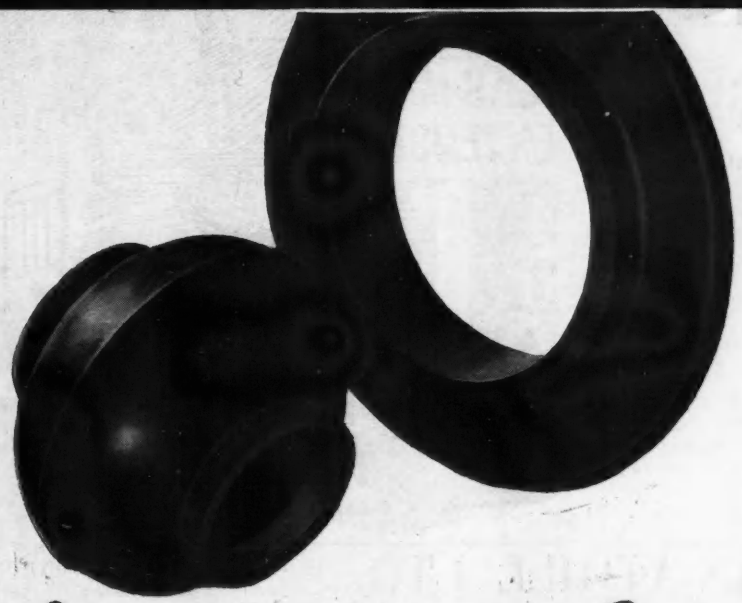

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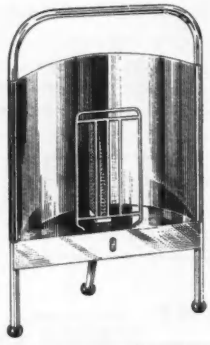

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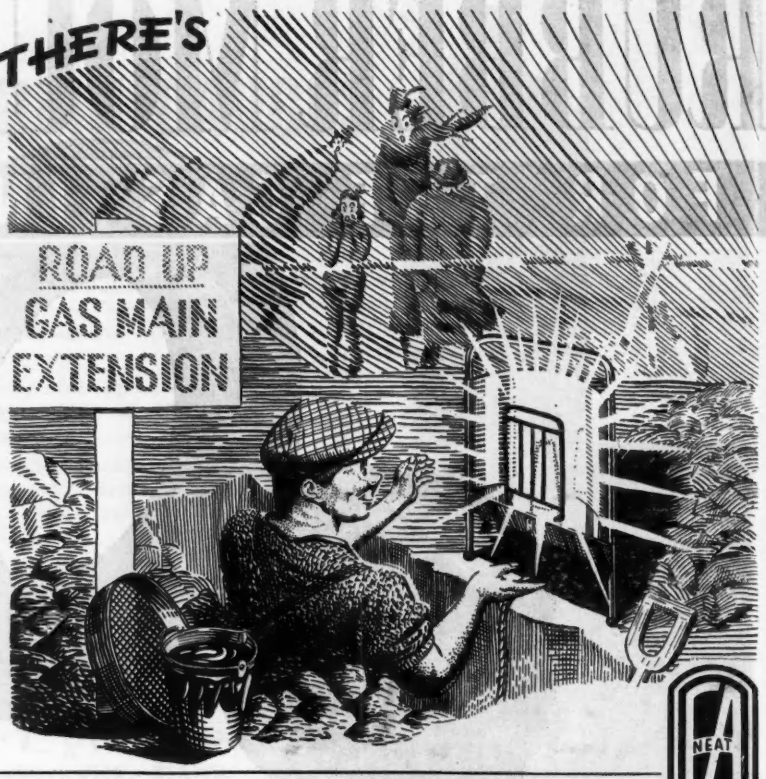

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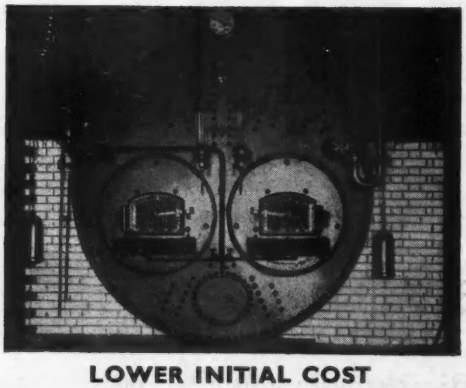

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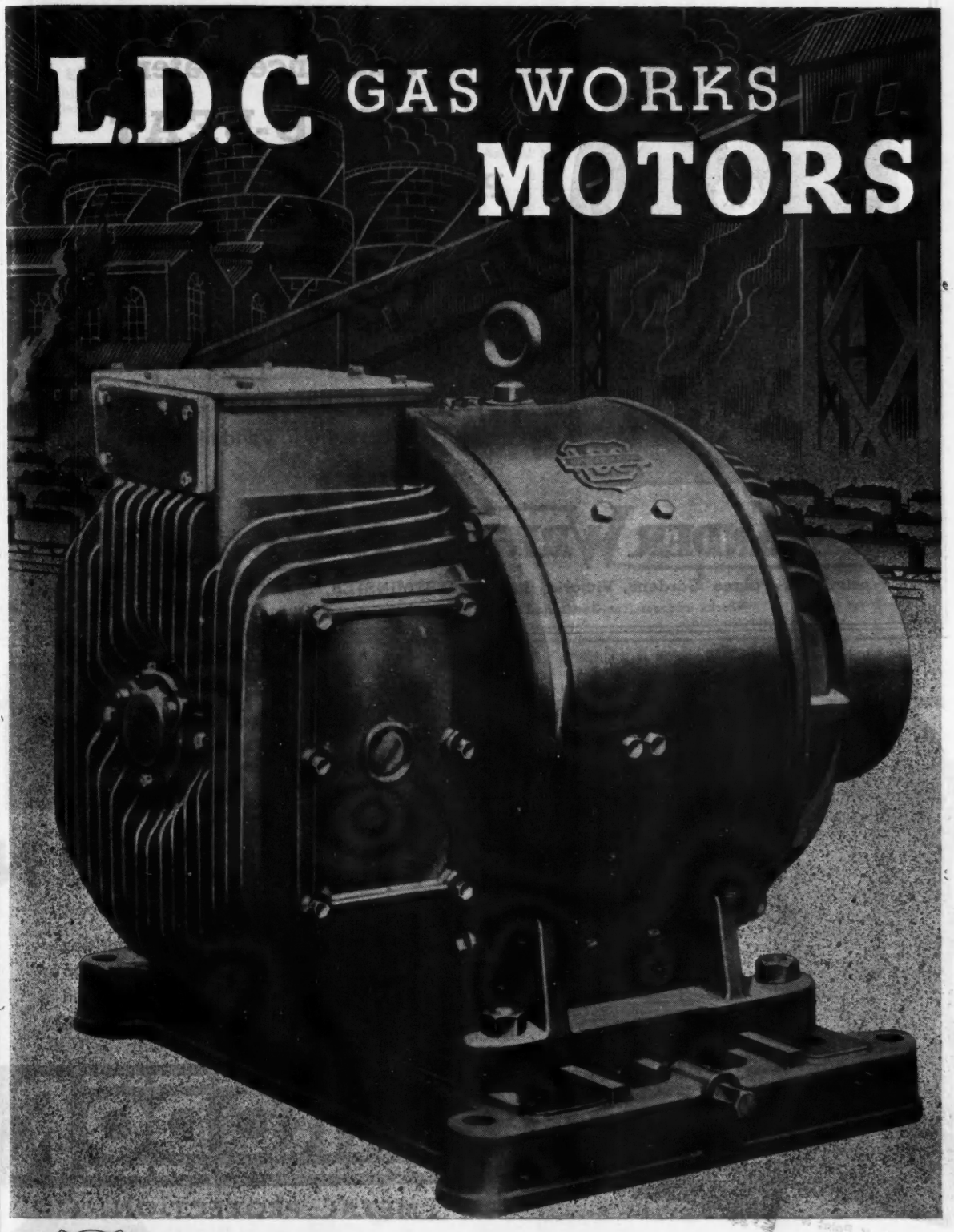

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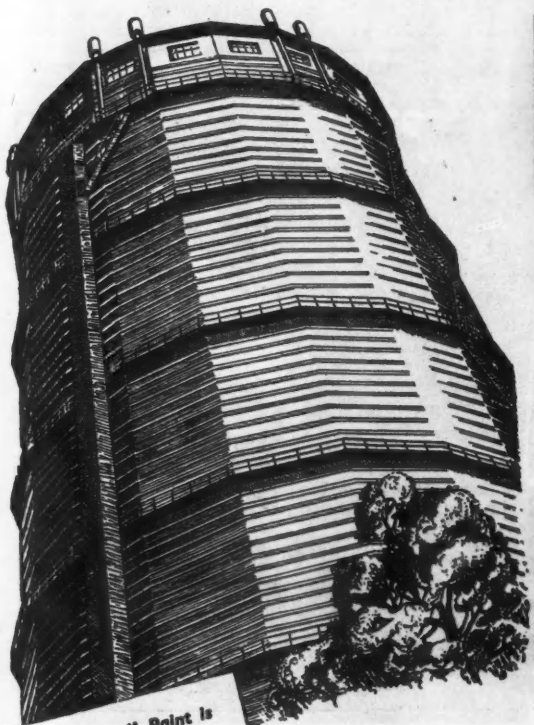

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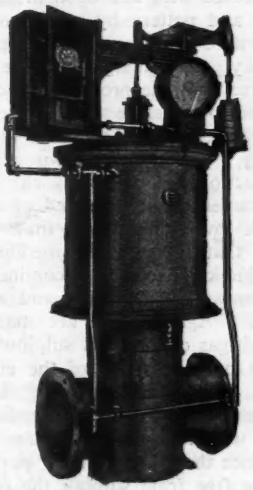

Fig. 129.

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GAS JOURNAL, JULY 3, 1946

VOL. 248 98th YEAR No. 4337

ORGANIC SULPHUR REMOVAL

AMONG the major technical problems before the Gas Industry to-day is the removal of organic sulphur compounds from town gas. There are well-known reasons connected with the use of flueless heaters and with the corrosion of gas appliances which make it desirable to reduce the sulphur content of domestic gas to a very modest amount. It is equally desirable to remove sulphur compounds from some industrial gas. There are industrial processes such as the manufacture of steel in the open hearth furnace from which it is desirable to remove sulphur down to the limit of at least 50 grains per 100 cu.ft. The cost of doing so has generally caused no attempt to be made to limit the sulphur content of fuels for the open hearth furnace. That, no doubt, will come in due course. There are other industrial processes, however, in which even the 15-30 grains of sulphur normally found in town gas is altogether too high. In the glass industry quite a small quantity of sulphur in the fuel leads to unsightly milkiness in the ware due to the formation of lead sulphate and its subsequent removal. The formation of bloom which results from the presence of sulphur in the heating gases prevents such parts of the ware as jug handles from adhering to the main body, a defect which may only become apparent when the manufactured product is put into use. In the pottery industry, the sulphur will affect glazes, colours, and enamels used in decoration. The present thermal efficiency of heating pottery ware enclosed in clay saggars is of the order of 10% only, and this can be increased to 30% or 40% when saggars are dispensed with and open firing adopted. When firing glazed tiles and pottery by solid fuel, protection must be afforded the ware by placing in saggars, otherwise the fumes and smoky gases damage the glazes and colours. This means, of course, that the protecting and supporting materials must be raised to the same temperature as the ware inside and is one of the causes of the low thermal efficiency of solid fuel firing. With clean town gas of low sulphur content the protection can be largely eliminated and at the same time a guarantee can be assured of better finish and less spoilage. With low sulphur gas, these advantages, coupled with the fact that through the medium of tunnel kilns and ovens production becomes a continuous process, makes gas firing a thoroughly economic and altogether satisfactory proposition. Again, there are many metallurgical processes for which gas of very low sulphur content is desirable. Mention need only be made of the effect of SO_2 on the scaling of steel, of the importance of elimination of sulphur in bright annealing, and of the embrittlement caused in nickel by contact with hot gas containing sulphur.

Since there are so many purposes for which gas is required to be free from sulphur the problem arises as to whether it is best to purify gas at consumers' premises or to purify the whole of the gas at the gas-works. At present, there are probably more small plants at consumers' premises for securing sulphur-free gas than at gas-works. There are some who would maintain that to saddle the whole output of gas with the cost of further purification from sulphur would be undesirable. We do not think, however, that this opinion is very generally held. For practically all domestic purposes except perhaps cooking, and for quite a number of industrial purposes, gas virtually sulphur-free is required. We believe that it would be far better to purify gas from sulphur down to 5 grains per 100 cu.ft. at the works than to put in at consumers' premises plant for the purification of industrial gas which must be a comparatively expensive matter since the scale of operation is small.

The first attempt to remove organic sulphur made by Carpenter and Evans and published by them in 1914 is now a matter of history. A catalyst which was regarded as consisting of a mixture of nickel with a small quantity of nickel sulphide was used for the purpose and operated successfully, for the most part at consumers' premises, for a number of years. The recent increase of interest in the production of a sulphur-free gas has led to three major types of process. One of these comprises the absorption of benzole by much larger quantities of wash oil than is necessary for benzole alone, whereby most of the organic sulphur compounds, down to about 8 grains per 100 cu.ft., are removed with the benzole. This process is in successful large scale operation in many places, but it has a certain—though perhaps not very serious—disadvantage in that the sulphur content of the benzole is increased. The other processes involve hydrogenation to hydrogen sulphide over a catalyst, and oxidation to sulphur dioxide over a catalyst, the resulting H_2S and SO_2 being removed subsequently from the gas.

HARROW PLANT

THE reports of the Gas Research Board indicate the activity with which the elimination of organic sulphur is being pursued. The work of Dr. Griffith and his collaborators, carrying on the development of the nickel catalyst for the conversion of sulphur compounds to SO_2, is evidence of the progress being made. Those attending the annual meeting of the Institution of Gas Engineers last month were able to inspect the catalytic plant of the Gas Light and Coke Company at Harrow, which plant reduces the nitric oxide content of the gas to about 0.1 part per million, and sulphur in the outlet gas, other than thiophen, is reduced to a concentration between 1½ and 4½ grains per 100 cu.ft., depending on the sulphur in the original gas and other circumstances. At these works, though the thiophen is not decomposed by the nickel subsulphide catalyst, it is almost completely removed by an active carbon plant, and the district gas contains a total of only 2 to 5 grains of sulphur per 100 cu.ft. As we have said, the catalyst used in the Harrow plant does not decompose thiophen, although the other sulphur compounds are destroyed. While treatment in a benzole plant can remove the bulk of the thiophen, it would be advantageous to find a catalyst which would cause it to react. With this objective, work at the Fulham laboratories of the Company, which were also inspected during Institution week, is concerned with a study of the behaviour of thiophen. Measurements are being carried out by absorption on catalysts, by investigation of the kinetics of reactions involving thiophen, and by a fundamental study of the structure of a series of catalysts. The apparatus used for adsorption measurements was demonstrated, and methods employed in dynamic systems were also shown; this series of experiments has arisen from the fact that thiophen is relatively easily hydrogenated by several catalysts in the presence of pure hydrogen, but completely unaffected, with the same catalysts, when coal gas is present. When the cause for this difference is fully understood, much progress will have been made towards the solution of the thiophen problem.

Another type of process has lately been described in our columns which appears to have been tried for a sufficient period to demonstrate its soundness, and which is already in successful operation on a gas-works and at consumers' premises. The use of molybdenum sulphide as a hydrogenating and dehydrogenating catalyst is well known and it is virtually unaffected by sulphur. Contact substances for supplying sulphur in the form of H_2S from the organic sulphur compounds in coal gas must be tolerant to sulphur. These facts have been noted in annual reports of the Gas Research Board and have been used by Dr. Maxted and Mr. J. J. Priestley for the development of a thiomolybdate catalyst for the conversion of organic sulphur to hydrogen sulphide. We shall return later to this important and significant development, which has been described by the Authors concerned in the columns of the "JOURNAL."

PROTECTION

FOUNDED 48 years ago to pay particular attention to all matters affecting company undertakings, whether statutory or non-statutory, as distinct from local authority undertakings, the Gas Companies' Protection Association last week held its first general meeting since the beginning of 1940. During the war years its members were too fully employed in meeting increased demands with depleted staffs—and how well they did their job was shown by statistics quoted by the Chairman—to find time for meetings. They are still no less busy in striving to meet post-war demands, but recent events of outstanding importance to the Gas Industry—the publication of the Heyworth Report and the Government's declaration of its intention to include the Industry among those to be nationalized—present new problems that call for consideration. On the Heyworth Report, the Association does not accept the contention that the end in view could not be obtained by voluntary process and it does not agree that the regions proposed by the Heyworth Committee are necessarily the best suited, in number or size, to effect the desired measure of integration. Its attitude towards nationalization is summed up in the conviction that the interests of consumers would not best be served by the transfer of the Industry to national ownership. But if the Government is determined to implement its policy, the Association would, with traditional regard for the interests of consumers, help to make the transition as smooth as possible.

Nationalization would, *ipso facto* and *inter alia*, put an end to the Gas Company's Protection Association, for there would be no companies to protect, and some entirely different means would have to be found for the protection of the consumer, the employee, and the "shareholder"—*i.e.*, the taxpayer. In the transition there would be many difficult points to be solved, one of the chief of which from the point of view of the Association is the question of compensation. We were privileged to listen to, but not to report, the discussion which followed the routine business at last week's meeting, and we do not think we are breaking any confidence in saying that, while confirming the general statement of policy in the printed report, the members, in the freedom of private debate, provided the Committee with some useful pointers as to future action. The Committee, with a verbatim report of the discussion before it, will meet shortly to decide its next move.

Our issue last week carried a review of "Manual of Carbonization in Horizontal Retorts," written by G. M. Gill, M.Inst.C.E., M.I.Mech.E., M.Inst.Gas E., aimed to interest and instruct all those who work in or are responsible for the operation of horizontal retort houses. The manual—we quote from the review—"Will prove of great value to all who read it with the care it deserves . . . . . it will fill a long empty gap on the bookshelves of the man whose business it is to get the best out of his coal and his horizontal carbonizing plant." Essentially a practical work, this book is now available at the offices of Walter King Ltd., 11, Bolt Court, Fleet Street, E.C.4, price 3s. post free. Its 68 pages include 20 illustrations.

Letter to the Editor

Happy Years of Service

DEAR SIR,—May we, on the eve of our retirement, express through the medium of your columns our sincere thanks to all our colleagues in the Gas Industry for the kindness and consideration accorded to us for over a quarter of a century.

Due to this, our work and life in the Industry have been rendered extremely happy, and we are very grateful.

With sincere wishes for the future well-being of the Industry and of those engaged in it.—We are, Yours faithfully,

SHOLTO S. OGILVIE.
EDWARD J. FOTTRELL.

1, Grosvenor Place, London, S.W.1.
June 27, 1946.

[Colonel Ogilvie and Mr. Fottrell have been Joint Managers of the National Gas Council since 1918. Referring in its first annual report last month to their impending retirement as from June 30, the British Gas Council said: "These retirements deprive the Council of the experienced and able service of gentlemen who have served the Gas Industry with distinction."—Ed.]

Personal

Mr. J. L. STEWARD, formerly secretary of the York Gas Company, has been appointed secretary of William Gray and Co., Ltd., shipbuilders, West Hartlepool.

* * *

Mr. C. H. PEARSON has been appointed General Manager of the Gas Meters Division of the Parkinson & Cowan Group of Companies.

* * *

Mr. J. W. M'LUSKY, Engineer and General Manager of the Glasgow Gas Department for many years, is to retire for health reasons. He has agreed to continue until the end of November, and a sub-committee has been appointed to report on the appointment of a successor.

* * *

Mr. J. H. FULTON, Assistant Engineer and Manager at Dumbarton since January, 1944, has been appointed Engineer and Manager of Haddington Gas Company. Mr. Fulton received his early training with Glasgow Gas Department, and in 1940 was appointed Technical Assistant at Paisley, from which works he joined the staff at Dumbarton.

* * *

Mr. F. SHEWRING, Engineer and Manager of the Stratford-on-Avon Gas Department, is retiring after 25 years' service. In a tribute to him at the June meeting of the Town Council, Mr. R. L. Dingley, Chairman of the Gas Committee, said that through Mr. Shewring's untiring efforts the gas undertaking had relieved the rates to the extent of £18,850, and the make of gas had increased by nearly 300%. At the time of Mr. Shewring's appointment matters at the gas-works were none too rosy, there being an adverse bank balance and £6,735 owing on carbonizing plant, but at the end of the last financial year there was a surplus of £5,796. In 1921 the price charged for gas ranged from 4s. 8d. to 5s. 2d. per 1,000 cu.ft., and to-day, despite the greatly increased cost of coal, the price was from 2s. 7d. to 3s. 2d. As soon as Mr. Shewring joined the Department a long-term period of reconstruction was envisaged by him, and as the Corporation bought additional land, extensions were made, which culminated in a modern gas-works consisting of vertical retorts, mechanized coal handling plant, waste heat boilers, static ammonia apparatus, electrical detarrer, and benzole plant.

Diary

July 5.—Manchester District Association of Gas Engineers: President's Day: Visit to Bradford.
July 6.—British Gas Staff Association: Eastern Scottish meeting, 3 p.m.; Heriot-Watt College, Edinburgh.
July 8.—Women's Gas Council: Executive Committee, Gas Industry House, 1 p.m.
July 9.—British Gas Council: Gas Industry House, 2.30 p.m.
July 9.—National Federation of Gas Coke Associations: General Committee Meeting, 10 a.m., Gas Industry House.
July 11.—Midland Counties Coke Association: Central Committee, King Edward House, Birmingham, 11.30 a.m.
July 15.—London and Counties Coke Association: Finance Committee, 11 a.m.; Executive Committee, 11.30 a.m.; Central Committee, 1.30 p.m., Gas Industry House.
July 16.—National Federation of Gas Coke Associations: National Technical Committee Meeting, 2.30 p.m., Gas Industry House.
July 16.—British Standards Institution Annual General Meeting, Institution of Mechanical Engineers, Storey's Gate, S.W.1. 3.30 p.m. Lord Woolton in the Chair.

Southern Association Summer Meeting

Members of the Southern Association of Gas Engineers and Managers were the guests of the President's Company on June 26, and journeyed to Maidstone for a most successful day. "President's Day" is a source of anxiety and pride to a President faced with the prospect of entertaining a large number of visitors for a space of seven hours. Mr. W. A. Howie, who is Engineer and Manager of the Maidstone Gas Company, had much cause for pride and little for anxiety, for all visitors will testify to his powers of courtesy and organization. In the morning the members made a short tour of the works, while the ladies, for whom a gas-works excites less appeal, visited local places of interest.

The works themselves, which seem to have escaped the congestion sometimes found in provincial works, held several points of interest, chief among which was the new carbonizing plant which is in course of construction. The new plant replaces the old No. 3 bench now demolished and new piled foundations are constructed to a depth of 20 ft. over the original raft. The retort house has been altered to accommodate the whole of the new plant, including overhead coal storage hoppers, distributing coal conveyor, &c., within the retort house, and for this purpose it was necessary to raise the roof and walls to a higher level, which is supported on internal framework. The new carbonizing plant comprises a self-contained range of five main arches and five high efficiency patent re-circulator settings with large capacity producers. A new type of stoking machine capable of charging any weight of coal into the retorts is being installed. The new retort bench will be served by a retort house coal storage and handling plant comprising a main external coal receiving hopper with reciprocating feeder and coal crushing machinery, arranged for feeding an external coal elevator and overhead drag link conveyor discharging the coal to five bays of 40-hour capacity continuous coal storage hoppers, all arranged under the retort house roof. The lay-out of the new works also incorporates a waste heat recovery system and boiler accommodated in a new brick-built building with external up-cast to atmosphere. The whole of the work has been prepared so that the second stage of reconstruction comprising seven beds of ten retorts can be easily installed in the near future.

From the gas-works, coaches conveyed the members to the Boxley Works of the Maidstone Waterworks Company.

Following the morning visit, the members rejoined the ladies at the Royal Star Hotel, where luncheon was provided at the invitation of the Chairman and Directors of the Maidstone Gas Company. The toast of "The Guests" was proposed by Sir GARRARD TYRWHITT DRAKE, J.P., a Director of the Maidstone Gas Company, who said that among the company might be found "the lions of the Gas Industry in the South." He hoped that they had found the works of some interest and, while he regretted that they were not complete, he hoped they would be larger and better when the Association visited them again. As a Director of the Maidstone Waterworks Company, he hoped the visit to Boxley had been enjoyed. It was impossible to enumerate the guests, but he welcomed particularly Mr. G. P. Mitchell, President of the Midland Association, and Mr. F. Dawson, President-Elect of the Southern Association, and he was delighted that the Mayor, whose father had been a Director of the Gas Company for many years, and the Mayoress were present.

The Mayor of Maidstone, Alderman WILLIAM DAY, J.P., remarked that Maidstone was justly proud of its utility services. He pointed out that the Gas Company was an old Company; it was started in 1820 and was supplying gas in 1821. In those days one was charged so much per jet and was not allowed to use more than 4 in. of gas—nowadays one never saw 4 in. of gas! As an ex-Chairman of the Electricity Company he was glad to hear the visitors had seen the new pumping station which was well serviced by electricity. He had been urged to install electric cookers, but his wife still used a gas cooker. On behalf of the town he offered congratulations to Mr. Howie whose appointment as President had brought credit to the Association, but a lot more credit for Maidstone. In closing, he expressed his pride in the Gas Company and hoped the Association would visit them again in the near future.

The PRESIDENT thanked the many well-known people who had graced the meeting with their presence. He also thanked Lady Adrian Bailey, at whose invitation the members and their ladies were to visit Leeds Castle during the afternoon.

The vote of thanks was seconded by Mr. E. L. NICHOLAS, a past President of the Association.

Following the luncheon, the visitors were taken by motor coach to Leeds Castle, whose perfect setting and untouched dignity left a lasting memory. After a short tour of inspection the party returned to the hotel for tea, at which the President-Elect, Mr. F. DAWSON, took the opportunity of thanking Mr. Howie and the Directors of the Maidstone Gas Company for the hospitality they had received. When the 192 visitors finally took their leave of the President, there were many expressions of appreciation of an exceptionally interesting and enjoyable day.

Gas Companies' Protection Association

The first General Meeting of the Gas Companies' Protection Association for six years was held at the Alliance Hall, Westminster, on June 24. In the absence of Mr. Frank H. Jones, President, the chair was taken by Mr. F. G. Brewer, Chairman of the Committee, who, in moving the adoption of the report, extracts from which were published in the "JOURNAL" of June 19 (page 1004), reviewed the outstanding events since the Association last met in January, 1940.

His uppermost impression of the war years, he said, was the supreme unity which marked the endeavours of the nations among themselves and the people within the nations. Each industry, each individual, realized and recognized their goal and felt that they had their particular contribution to make to the common cause. In that great communion of effort it would be wrong to regard any one industry as standing out from the others, but the Gas Industry need not fear comparison with any.

Gas-works were targets high on the enemy's order of priority, yet in spite of heavy damage to works and to distribution systems the supply of gas continued uninterrupted save for short periods in localized areas, and homes and factories were kept going, and the flow of munitions, as well as the morale of the people, was sustained. The fortunes of war fell with varying incidence on different undertakings. Some, particularly in the Metropolis, suffered a marked contraction of output due to evacuation; the majority had to cope with greatly increased demands, which they met most successfully.

In preparing evidence for the Heyworth Committee, the Committee asked members for particulars of output and numbers of employees in the year immediately preceding the war and in 1943. They were much impressed by the great increase in outout in many cases accompanied by a large decrease in the number of employees. It was realized, of course, that work on the district had necessarily to be curtailed during the war and that in consequence fewer employees were required in that department of an undertaking's normal business, but even so it was remarkable that large increases in the manufacture of gas had been met by a heavily reduced personnel. There could be no other explanation than that everyone had put forth the utmost effort.

The weekly average output for all undertakings, statutory and non-statutory, in Great Britain in 1938 was 29,200,000 therms. In 1941, after decreases in 1939 and 1940, it had risen to 29,700,000 therms; in 1942 it was 30,700,000, in 1943 31,300,000, in 1944 32,900,000, and in 1945 it had risen to 34,700,000 therms. In January of this year it was 47,500,000 therms, in February 46,000,000, in March 47,400,000, and in April 39,700,000 therms. These figures were taken from the "Monthly Digest of Statistics" instituted this year by the Government Central Statistical Office. When it was remembered that these demands were met and were being met by personnel short of their full numbers, with plant which it had not been possible to renew or even fully to maintain during the war, and with coal markedly inferior in quality to that obtainable seven years ago, one need not hesitate from any feeling of modesty to say that the Gas Industry had done and was doing a very fine piece of work.

Mr. C. F. BOTLEY seconded, and the report was adopted.

The meeting unanimously agreed to the following re-elections: President, Frank H. Jones. Vice-Presidents, R. Bruce Anderson. F. J. Bradfield, D. H. Helps, and A. A. Johnston. Members of Committee, C. F. Botley, F. G. Brewer, E. H. Harman, B. A. Mallender, and A. G. Williams. On the retirement of Commander Hyde C. Burton, his brother, Mr. G. Murray Burton, was elected Hon. Auditor.

At the close of the ordinary business there was an informal discussion on the Government's declaration of its intention to nationalize the Gas Industry.

Bursaries in Chemical Engineering

The Institution of Chemical Engineers has decided to establish two bursaries, each of £100 per annum, for the purpose of assisting students to obtain a Bachelor's degree in chemical engineering. Candidates must have reached the Higher School Certificate or Intermediate B.Sc., or equivalent standard; they may have spent a period in industry or in the Forces.

The bursaries will be tenable for three years, subject to satisfactory progress reports at the end of each academic year. The candidate is not restricted to his place of study, provided that the course is a full-time one and leads to a degree of the standard approved by the Institution. The bursaries can only be granted to British applicants who are able to arrange for admission to a degree course.

Applications, giving date and place of birth, names and nationality of parents, details of the applicant's school career, and name of the headmaster of the school from which an opinion on the candidate can be obtained, should be addressed to the Joint Honorary Secretaries, Institution of Chemical Engineers, 56, Victoria Street, London, S.W.1, not later than July 31.

Main Water Heaters, Ltd.

In announcing the centralization of its Sales and Technical Departments in conjunction with that of production at the water heater factory at Gothic Works, Thornton Road, Croydon, Surrey, taking effect from July 1, Main Water Heaters, Ltd., mark another step forward in facilitating arrangements to deal promptly with the many problems connected with present-day conditions, including those created by the various housing schemes.

The firm was originally the Water Heating Department of R. and A. Main, Ltd., whose activities in the manufacture of gas-heated hot water appliances date back to the nineteenth century. The progressive development in design and construction has shown advances over the past 70 years, and has demonstrated the firm's appreciation of the ever-increasing importance of the water heating load to the Gas Industry.

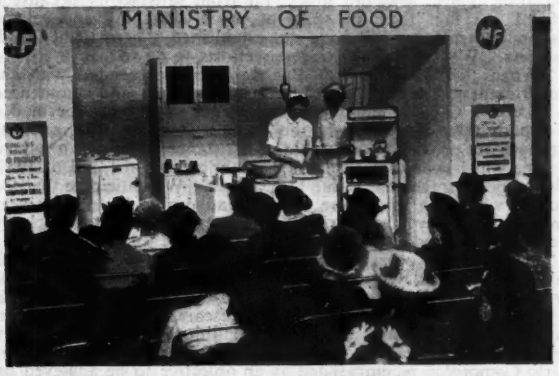
An interruption in this work was caused by the past war, when Main Water Heaters, Ltd., concentrated their energies on the manufacture of munitions, particularly, but not exclusively, those of sheet metal construction. Towards the end of the war they assisted in the efforts made on behalf of the Gas Industry by the installation of water heaters in the Government's demonstration houses at Northolt. Interest was then aroused by the new departure in totally enclosing such heaters within a panel-fronted cupboard or ducting. Since then the firm have helped in several Government and other housing schemes.

As is to be expected, the ruling shortages of raw materials and labour are restricting the firm's rate of output and the placing of new prototypes in production. Now being produced are the "New Junior" bath heaters of two types, one with interlocking gas and water cocks and the other with an automatic valve, and the improved G.L.C. heavy duty circulator.

Strenuous efforts are being made to overtake the accumulation of orders for these appliances and to increase the range of production. It is anticipated that shortly there will be available the "Thermain" No. 2, a re-designed two-gallon storage sink heater, and the "Pronto" instantaneous sink heater. We are informed that they will be followed later by the Main Multi-Point No. M.1, and Dual-Point No. D.1 instantaneous heaters. Two further storage heaters are also envisaged—namely, the "Thermain" No. 15, a 15-gallon bath and multi-point heater, self-contained, for wall-mounting, and the "Thermain" No. 25, a 25-gallon multi-point heater enclosed in a modern and easily accommodated cabinet.

The Sales Department at Croydon is under the charge of Mr. G. F. Jenkins, who was appointed Sales Manager at the beginning of 1939. He will continue to co-ordinate the sales representation of Main Water Heaters, Ltd., throughout the British Isles, and will co-operate closely with its associated firm, R. and A. Main, Ltd., in all matters relating to gas water heaters. The policy of centralization referred to should result in more direct contact being made and maintained with gas undertakings.

Home Planning Exhibition



Ministry of Food Cookery Demonstrations were well attended at the British Gas Council Home Planning Exhibition just ended at Selfridges, London. The New World is again in the picture.

Following the Retirement of Mr. Robert Henderson, who has managed the Company's Glasgow Office for many years, Peter Brotherhood, Ltd., engineers, have appointed Henderson Agencies (1945), Ltd., 26, Bothwell Street, Glasgow, C.2, to be their agents for the whole of Scotland and Northern Ireland.

More Cookers on the Way

A Scottish correspondent reports that increased supplies of gas cookers are on the way, but the demand continues to exceed the supply. When he enquired about the position in Edinburgh a few days ago, the Sales Manager of the Gas Department said: "Unfortunately the demand for cookers far exceeds the supply, and we do not want to be over-optimistic. We do see some improvement in future; but it is hard on people who have been waiting a long time to know that there are cookers coming and they cannot get them right away. Where there are exceptional circumstances of hardship, we try to do something for the people."

The Department was taking a human view of what was a very difficult problem, and in homes where babies were expected there was little delay in having cookers installed. The Ministry of Works had introduced a new scheme for priority for gas cookers. There were three categories of supply, the first being to new housing, the second for converted houses, and the third for people who had no means of cooking at all.

A large number of new cookers of modern type will be available shortly. On the long waiting list, cases of exceptional hardship, where there are no means of cooking available, are given first priority in Edinburgh. "That is an inflexible rule." Where houses are being divided to provide accommodation for more families a new larger cooker was installed provided the smaller one was given up in exchange.

Cookers are sold outright to the public now, by the Corporation. The pre-war hire-purchase system has been discontinued during the war. During the war gas cooker manufacturers were engaged on making munitions, &c., and the great shortage of iron moulders is hampering their efforts to increase their output of cookers.

Many people on taking over a house to rent for the first time, find that the previous tenant has removed the one and only gas cooker. In several cases the Gas Department has come to the rescue with what were formerly condemned cookers which have been made serviceable as a temporary measure. The latest deliveries take approximately six months. One housewife who placed her order in December last has just had a new model installed.

The shortage of housing and the increased number of couples living in rooms has been responsible for an unprecedented demand for the humble gas ring, hot plates and grills. A Sales Manager in one big Edinburgh ironmongery store said: "I have sold over a gross of gas rings in under two weeks. We have a few left, but all the hot plates and gas grills have been bought up. I have sold more gas rings now than I ever did before the war."

So far as the supply and demand of gas cookers to private firms is concerned, whenever a firm takes an order from a customer the latter's name and address are forwarded to the Gas Department. The latter send out an inspector to the house of the would-be purchaser, and if the inspector considers a new cooker is essential, the name is placed accordingly on the list. Before the war very few private firms dealt in gas cookers in Edinburgh.

The Circular 112/46, of June 14, issued to Housing Authorities by the Ministry of Health, intimates, *inter alia*, that housing estates should not be serviced only by gas or by electricity to the complete exclusion of the other, this being prejudicial to the co-ordinated development of both industries and depriving the consumer of the freedom of choice to which he is entitled.

Gas Street Lighting at Glasgow has been resumed after a suspension since the beginning of June. Street lighting was withdrawn in response to the appeal of the Ministry of Fuel and Power economy, but this move was criticized at a recent meeting of the Glasgow Corporation. During the blackout period there was an increase in housebreaking crimes. At a special meeting of the Corporation it was unanimously agreed that modified lighting should be continued.

Darlington Town Council has accepted the tender of W. Press & Co., Ltd., at £21,861 for the laying of a 30 in. gas main, new inlet and outlet main to No. 6 gasholder, high pressure trunk main from the gas-works to the junction of Clifton Road and Parkside, and a high pressure main to the Aycliffe trading estate. Cochranes (Middlesbrough), Ltd., are to supply the cast-iron pipes. The Corporation has also accepted the tender of West's Gas Improvement Co., Ltd., at £7,883 for resetting vertical retorts.

Rochdale Gas Committee has recommended for acceptance a tender for the erection of a new gasholder at the gas-works, part of a reconstruction scheme which has already been approved by the Council and Ministry of Fuel and Power, and both will now be asked to approve the expenditure on the holder, which will have a capacity of 2,000,000 cu.ft. and will cost approximately £100,000. Rochdale's gas consumption has increased by 60% since 1939. When the new holder is complete, the total capacity will be 4,500,000 cu.ft.

Waverley Association: Annual Meeting

THE Annual Meeting of the Waverley Association of Gas Managers was held in Edinburgh, on June 21, the President, Mr. H. ROBINSON, Annan, welcoming a large attendance.

At the outset the President expressed pleasure at the presence of Mr. George C. Pearson, President of the Institution of Gas Engineers, and Dr. W. T. K. Braunholtz, the Secretary.

Mr. PEARSON said it was fitting that Dr. Braunholtz and he should visit the Waverley Association in view of the fact that it was only recently that it had affiliated to the Institution. The Association was the oldest in the Industry and the parent of all the others, including the Institution itself.

New Members

Ordinary Members: Thomas Haxton, Aberlady; William Malcolm, Duns; A. McFadyen, Dumbarton; H. Adams, Cumnock; James Henderson, West Calder; D. J. Colvin, Caledonian Gas Corporation; P. T. MacMillan, Alyth; George E. H. Keillor, Airdrie; J. Wilson, Shotts; J. Foster, Largs; and J. Barbour, Saltcoats.

Extra-Ordinary Members: William MacRae, Associated Lothian Coal Owners, Ltd.; Lewis Fletcher, Jnr., Parkinson Stove Co., Ltd.; Charles Keith and Frederick Johnson, Ascot Gas Water Heaters, Ltd.; H. H. Webster, R. and A. Main, Ltd.; L. B. Steele, Standard Furnace Setting Co., Ltd.; and J. Taylor, D. C. Workman and Co.

It was intimated that the name of Mr. James Dickson, Engineer and Manager, Dundee Corporation Gas-Works, was being put forward by the Committee for the office of President for the ensuing year, Mr. Dickson being elected unanimously.

Mr. DICKSON, returning thanks for the honour, said he was just on the turn of the road. If he survived until September he would complete 50 years in the Industry, 40 of which he had spent as a Manager.

Mr. R. J. PHILP, North Berwick, was unanimously re-elected Secretary and Treasurer, the President pointing out that next year Mr. Philp would complete 25 years in office.

Messrs. R. Cowie, Hawick, and D. D. Melvin, Edinburgh, were unanimously elected to vacancies on the Committee, Mr. W. M. Henderson, Dalkeith, being appointed Auditor in place of Mr. John O'Halloran, resigned.

In connexion with the resignation of Mr. O'Halloran, it was pointed out that he had held office as Auditor since 1905. Various members paid tribute to his work.

It was agreed that Messrs. R. Cowie, Senior, Hawick; John Richmond, late of Penicuik; and John O'Halloran be elected Honorary Members.

Sympathetic reference was made by the President to the deaths of William Mann, Stevenston; Peter Low, Elgin; J. Barker, Nairn; J. Roberston, Cardenden; A. C. Finnie, Melrose; and M. Scott, George, Durham (extraordinary member).

Thereafter the Presidential Address was given by Mr. Robinson. (See p. 27.)

Presentation of Medal

Mr. J. JAMIESON, Edinburgh, Immediate Past-President, presenting the Association's Medal to Mr. Robinson, said it was an honour to be asked to do so. He conveyed it to the President with the best wishes of the Association.

Mr. ROBINSON briefly replied.

Mr. DAVID FULTON proposed a vote of thanks to the retiring President, office-bearers, and Committee, Mr. ROBINSON expressing his great indebtedness to the Secretary, Mr. R. J. Philp.

At a subsequent luncheon, Mr. Robinson presided. Lord Provost J. I. FALCONER, Edinburgh, proposing the toast of the Gas Industry, said the Industry had grown to be one of the most important in the country, supplying the raw materials for many other industries. There had been an increase in gas sold between 1920 and 1944 of nearly 60%.

It employed directly some 125,000 workers; it ranked seventh in the country as an employer of labour, and some 200 million pounds were invested in it. Lastly, it had 11,000,000 consumers out of about 12,000,000 families in the United Kingdom. The Industry had brought about a revolution in the home and the factory. In the home gas enabled people to live more fully. It reduced smoke and atmospheric pollution and brought sunlight into the home. It saved fatigue and removed the drudgery attendant on the use of raw coal. In the canteen it made ever-ready and well-cooked meals possible and provided arrangements for washing and bathing in factory and office cloakrooms. Gas, therefore, was more than a mere commodity. It had a relationship to health and wealth and the good of the community.

Mr. GEORGE C. PEARSON, replying, paid tribute to Edinburgh as one of the most beautiful and well ordered cities in the country. It was with great regret they had to cancel the Institution Annual Meeting due to be held in Edinburgh when the distinguished Manager, Mr. Jamieson, was in the chair. The Gas Industry was passing through a most difficult phase, but they had to agree that a certain amount of reorganization and integration was necessary so that the services enjoyed in some localities might be extended to all. Their duty was to serve the public, and whether this could be done better by nationalization or not was a matter of controversy. They had to take the good points that came from nationalization and hold on to them. And they had to see where they were going.

Mr. ROBERT COWIE, Hawick, proposing the toast of Kindred Associations, said there were no fewer than 52 associations linked up with gas. There were eleven senior associations, and the Waverley was proud to be the oldest of the family, formed in 1861, with the North British coming a year later and the Chartered Institution in 1863. There were nine junior associations, in which many of them had spent very happy days. Then there were the two babies, the British Gas Council and the Scottish Association of Engineers and Managers, whose function was to look after the interests, and particularly the emoluments, of its members. It might be appropriate to include them in the toast and to commend their activities to that gathering. A few days previously Mr. Shinwell had stated the Industry would be taken over lock, stock and barrel. The metaphor was a proper one, but whether firearms were pistols or anything else, they had to be kept cleaned and oiled. Their Association had the duty of lubrication. It was meetings like these that took away the rust and helped the wheels to go round.

Mr. T. S. LOCKHART, Rothesay, President of the North British Association, responding to the toast, recalled how Mr. Cowie's father, who was present, was the last President of the North British Association to hold office when that body held one meeting only each year. It might yet be that the Waverley and the North British Associations would get together to form one powerful united body.

Mr. S. C. JOHNSTONE, Dumfries, proposed a vote of thanks to the President.

Annual Bowling Match

Winning rink: E. King; H. C. Gray; J. Ednie; R. Allan, skip. Second: W. Gray; Bailie Airlie; A. Livingstone; J. Coupar, skip.

Golf Competition, Baberton Golf Course: (1) L. Fletcher, jnr., Glasgow, 75; (2) W. McRobbie, Edinburgh (77); L. Fletcher, snr., Glasgow (79).

Gas Research Board

The Annual General Meeting of the Gas Research Board was held in London on June 18, when the Chairman, Dr. E. V. EVANS, said that before proceeding to the formal business, he was sure they would wish him to refer to the great loss they had experienced by the death of their President, Sir David Milne-Watson. They would remember him especially as one who, not himself a scientist, yet understood the aims and achievements of research and lent to them his sympathy and support.

Dr. Evans continued: "The expenditure during 1945 reached a figure of £36,000 and the proportion of this absorbed as office expenditure is satisfactorily low. The expenditure upon accommodation is also low, but this is far from satisfactory because it reflects the fact that, in spite of much searching and several disappointments, we still have not established a permanent Headquarters. We are not relaxing our efforts to do so.

"When the Gas Research Board became associated with the Department of Scientific and Industrial Research and commenced to receive a Government grant, one of the conditions specified a minimum rate of growth in the income from industry and the arrangement provided for a scale of assistance covering an annual income which would reach £50,000 per annum by the end of 1947, when a new arragement is due to be made. We anticipate that the income will reach this figure in 1946 and during the present year we hope to receive the maximum Government grant to which we are entitled under the existing arrangement.

"On previous occasions I have expressed the view that the value of the work of a Research Association is not to be assessed by the amount of money it spends, still less by its income, but it is relevant to observe that the Gas Research Board in its comparatively short life and despite war conditions has, by an entirely voluntary effort, reached one-quarter of the sum which the Heyworth Committee recommended as an objective to be achieved by a compulsory levy. I may add that if our income were suddenly to increase to £200,000 per annum, it would take us several years to expand our organization to employ the funds usefully.

"We may be confident, and we are confident, of our ability to carry through a big programme of development with existing technique, but we are equally certain of the new methods which increased knowledge and understanding of coal processing will provide. Both the Heyworth Committee and the Simon Committee have laid stress on the need for research, and the Gas Industry can take credit for having established and commenced to build an organization ready for the responsibilities of the future."

On Many Topics

At the Annual Meeting of the Institution of Gas Engineers a session was devoted to "Question Time," when the following queries were put forward and answer given to them :—

Flexible Tubing

What is the practicability of obtaining flexible tubing for connecting such domestic appliances as gas irons, pokers, boiler rings, and—if we must have them—portable gas coppers and portable heaters which will not smell of gas after a few weeks' use? If inodorous tubing is not obtainable at present, may the search for it be handed over to the appropriate Research Committee?

Mr. **Austin** (Gas Light and Coke Company) : Flexible tubes must be strong, gas tight, light in weight, and neat in appearance. They should have a long effective life under normal conditions of usage, be reasonably cheap, and, above all, remain free from odour after a long period of use.

Words such as these were addressed to the Institution of the Rubber Industry in a Paper which I presented to them in 1935, when it was felt that a fuller understanding of our particular requirements by the rubber industry would do much towards the development of better flexible tubes.

Although we have since had considerable assistance from rubber manufacturers and makers of flexible tubing, we have not yet succeeded in producing a tube which we are certain will meet all these requirements.

Flexible metallic tubing is, of course, practically odourless, but it cannot be regarded as being strong and it suffers from the drawback that its soundness and flexibility depend upon a sliding joint between the metal from which it is formed and a thin, soft rubber thread which is placed between the folds. This thread forms a continuous joint and is approximately 10 times as long as the finished tube ; a tube 3 ft. long thus contains roughly 30 ft. of rubber thread, every inch of which is a potential source of leakage.

Tubes made entirely from rubber and rubber-like materials possess a number of advantages over flexible metallic tubing. They are, on the whole, lighter, more flexible, and are not readily crushed. They have a greater resistance to abrasion and withstand considerable stresses and rough usage, but they do acquire that unpleasant odour which so often appears when such tubes are in contact with gas for any length of time. A tube which has become saturated with gas contains a higher concentration of the smelly constituents of gas than is present in the gas itself, and consequently its odour in this condition is offensive.

Before the war, certain gas-resisting rubber compounds showed considerable promise, although we frequently experienced difficulty in obtaining batches which were consistent in quality ; but with the wartime loss of the rubber plantations and the prohibition of the use of a number of compounding ingredients, the gas-resisting quality of rubber tubes has deteriorated.

In recent years, some makers have produced tubes from plastics, and although rather wide claims are being made as to their general performance and freedom from odour, laboratory tests with most of these materials have, so far, failed to show that they are, in the long run, a marked improvement on the rubber which they are intended to displace. These remarks apply more particularly to those tubes which are extruded from plastic and not to those which are built up from a combination of plastics and other materials. In this latter form of construction it is possible to sandwich a truly gas-resistant layer of material between inner and outer lavers of other materials which are not, in themselves, necessarily of gas-resisting quality, but which impart to the tube the required degrees of strength, soundness and flexibility.

At Watson House we have done a good deal of work on this particular form of tube, and our laboratory tests, supplemented by somewhat limited district experience, have indicated that tubes formed in this manner may be expected to give good results.

In some makes of tubes which are being made to-day, inner sleeves of plastic material are inserted inside rubber tubes to protect the rubber from the action of gas. In others, tubes are being made with walls of extra thickness in the hope that the additional thickness will retard the migration of the smelly consituent of gas to the surface, but we have not found either of these expedients to be of any lasting value. Considerations of compactness, flexibility, and weight restrict the types of materials which may be used in practically all forms of flexible tubes ; and here a warning should be added that in many which are being marketed to-day, compactness has been obtained by making gas passage smaller than is desirable. The inclusion of inner sleeves, spiral supporting members and the attachment of poorly designed connector ends have, in many instances, greatly increased the resistance to gas flow and so limited the gas rate at which such tubes may be used.

There is clearly an urgent need for an entirely gas-resistant flexible tube, and although the combined efforts of both the makers and the users have so far resulted in only limited progress in this direction, it is felt that a complete solution to the problem may be found in the use of one or more of the new materials which are now being produced. In this connexion, the full co-operation of the rubber and plastics industries will be most welcome.

Continuous Vertical Coke for C.W.B. Production

What is your opinion regarding the utilization of continuous vertical retort coke for the production of C.W.G.?—i.e., how do the relative advantages of continuous vertical retort coke over coke produced under static conditions, such as higher C.A.B. value and better reactivity, balance against the disadvantage of lower bulk density?

Which of the above types of coke will give the greater thermal output from any given size of plant?

Dr. **Weston** (Gas Light and Coke Company, Fulham Laboratories) : I shall assume that the only variable is the type of carbonizing plant used for the production of the fuel—*i.e.*, that the ash nature and content and the original size of the fuel are the same.

Dealing first with the C.A.B. value of the fuel, this, like all tests designed to measure combustibility—*i.e.*, reactivity towards oxygen—is carried out at a low temperature, where differences in combustibility are discernible. Haslam and Russell, over 20 years ago, were the first to point out clearly that at temperatures above 700°C. the rate of reaction of oxygen with carbon is so rapid that it depends solely on the rate at which oxygen molecules can reach the carbon surface through the gas film thereon. Since the reacting surface of the charge in the lower part of the generator will always be above, say, 1,100°C., the lower C.A.B. value of continuous vertical retort coke will have no effect on the primary combustion zone. The depth of this zone will depend only on the ash and clinker disposition and the size of the fuel, all of which we are assuming constant.

The reactions between steam or CO_2 and carbon are, however, time reactions. They depend on time contact, temperature, and the reactivity of the coke. They do not proceed to completion even at the temperatures prevailing in the generator fuel bed, due to the high gas velocities, and therefore the reactivity of the coke towards steam and CO_2 is important.

At first sight it would appear to be best to use a continuous vertical retort coke with a high reactivity towards steam, thus ensuring better steam decomposition and a better quality B.W.G.

Theoretically, under comparable conditions of rate of steaming, a reactive coke will assume a lower fuel bed temperature at the end of the run. This lower temperature will counteract the influence of the higher reactivity of continuous vertical retort coke to CO_2 during the first part of the blow only—*i.e.*, the CO_2 content of the blow gases during the early part of the blow with a continuous vertical retort coke will be substantially similar to that from coke made in static carbonizing plants. The lower heat storage capacity of the fuel bed, due to the lower bulk density of continuous vertical retort coke will, however, cause a more rapid rise in temperature of the fuel, with the result that during the latter part of the blow the higher reactivity of the continuous vertical retort coke will take control, giving a lower CO_2 content of the blow gases compared with coke carbonized in static systems.

Thus, to obtain the advantages of higher reactivity of coke towards steam, the blow period must be curtailed. Equally, the run period must be curtailed. Hence, to obtain the benefits of higher reactivity of continuous vertical retort coke for water gas production would demand operating a shorter cycle with the same rates of air and steam supply and the same percentages of blow and run.

But, the limiting factor in design of any automatic water gas plant is the proportion of time taken in valve operations and purging. Hence, in practice, since a plant should always be worked to the shortest cycle consistent with these limitations, the advantages of higher reactivity of continuous vertical retort coke cannot be realized and, moreover, if a plant could be designed to a shorter cycle specifically to operate on continuous vertical retort coke, then axiomatically the same plant could be applied to coke from static carbonizing systems, which would then restore the advantages of such a coke in respect of a higher CO_2 content of the blow gases and a higher output.

Operating a water gas plant with the shortest cycle possible is one of the surest ways of avoiding clinker trouble. With a water gas plant, the shorter the cycle which can be operated the smaller is the range of fuel bed temperatures as between the end of the run and the end of the blow. For example, direct observations of the point of maximum temperature in the fuel bed of a hand-operated set working a 5-minute cycle with a 2-minute blow have shown a range of temperature of 1,240° to 1,600°C., while in a fully automatic set working a 2.5-minute cycle, including 1-minute blow, showed a range of 1,190° to 1,380°C.

Coming to the question of total thermal output, this depends on the total amount of air that can be put into any given plant per day and the proportion of the heat generated by its combustion that is retained in the fuel bed.

With a continuous vertical retort coke the heat storage is less due to its lower bulk density. Further, its physical strength will be less, causing it to break down more easily under fuel bed conditions. The resultant smaller average size of fuel will impose a greater resistance to the air blast, so reducing the total volume of air per day.

It can, therefore, be said quite definitely that continuous vertical retort coke will give a lower thermal output from any given size of plant than will coke produced under static conditions.

Working Pressure in Gas Mains

What are the maximum working pressures considered permissible in gas mains of the following types:

(a) Cast Iron Mains

(i) with spigot and socket joints run with lead;

(ii) with mechanical flexible joints.

(b) Steel Mains

(i) with welded joints;

(ii) with mechanical flexible joints.

With regard to (a) and (b) above, should the permissible maximum working pressures have different values in respect of mains laid through built up areas and mains laid in country roads?

Mr. **W. Hodkinson** (General Manager, United Kingdom Gas Corporation, Ltd.):—

a (i) With regard to cast iron pipes with lead-run spigot and socket joints, I have known such joints, when made and tested for low pressure gas, to prove quite unsatisfactory when subjected to pressure of 1 lb. per sq.in.; conversely, I know of other cases where such joints have operated with reasonable satisfaction at 5 lb. per sq.in.

Similarly, I have experience of a 10 in. main, some four miles long, fitted at each joint with the Dresser type coupling, and operating on a mining district with reasonable satisfaction at 13 lb. per sq.in.

a (ii) Cast iron mains, with mechanical flexible joints, are being laid and tested to 60 lb. per sq.in. air pressure for an ultimate operating gas pressure of 45 lb. per sq.in. The maximum gas pressure applied so far, within my experience, has not exceeded 35 lb. per sq.in., and at this pressure the joints have proved completely satisfactory, even in mining districts subject to continual movement.

It has been considered that 45 lb. per sq.in. working gas pressure is the safe working limit for 12 in. and larger diameters; this is, however, a subject which is receiving our consideration.

b (i) Steel mains with welded joints are in common use at pressures up to 20 lb. per sq.in. in this country, and we have such mains operating with complete satisfaction at 35 lb. per sq.in. The testing pressure applied was 60 lb. per sq.in. air pressure for an ultimate operating gas pressure of 45 lb. per sq.in.

In American practice, as applied to the distribution of natural gas, heavy gauge hot finish seamless steel piping with the long sleeve welded joints is used at initial distribution pressures up to 800 lb. per sq.in.; this limit on pressure is, however, a function of the constitution of the gas, in that at certain combinations of pressure, temperature, and dewpoint the formation of methane hydrate will lead to blockage in the pipe line.

On a scheme for the distribution of natural gas which we designed for a certain area in this country the gauge of pipe for a 2¾ in. diameter main operating at an initial pressure of 800 lb. per sq.in. was 5 I.W.G. as compared with the normal 10 I.W.G. (Class B) pipe used for the normal pressures adopted.

Based upon by own limited experience, I am satisfied that, if initial pressures of 150 lb. per sq.in. can be proved economic, welded steel main can be provided to accommodate the transmission.

b (ii) With regard to steel mains with mechanical flexible joints, my experience is limited to operating pressures of 35 lb. per sq.in., although I am satisfied that such joints could be designed for pressures considerably in excess of this figure.

The subject of safe working pressure in built-up areas as compared with open country areas is obviously bound up with considerations of public hazard. So far as I am aware experience in this country is limited to that of the West Yorkshire Grid, which operates mains with cast-iron mechanical joints and steel welded joints in built-up areas at pressures of 35 lb. per sq.in., and we envisage raising this to 45 lb. per sq.in. as a maximum.

In closing, I would like to call the attention of members to the fact that there is an appalling lack of knowledge on the subject of distribution design for pressures in excess of 45 lb. per sq.in.; this was forcibly brought to our notice when developing the technique for this latter pressure in connexion with our work on gas grids.

Lieut.-Colonel **J. A. Gould**: In view of Mr. Hodkinson's remarks, I would like to make some observations on the matter:—

1. a (i) My experience has been that with spigot and socket joints run with lead it is not desirable to work at a higher pressure than 1 lb. in old existing mains, as it can be assumed that some of the joints may not have been particularly well made initially and the lead joint may be partly drawn. This, and my subsequent remarks, refer to isolated mains to which no service pipes are connected.

With a new main the joints of which are well made, particularly where they are yarned very tightly and thoroughly, pressures up to 3 lb. are suggested. This aspect—*i.e.*, the yarning of joints—cannot be over emphasized. Apart, of course, from good caulking, the secret of a well made lead joint is in the proper centralization and support of the spigot by tight "yarning." Unless strict supervision of and insistence on this is made, the spigots can settle in the sockets in course of time due to the creeping of the lead, and the joint will leak. I consider that the pressures mentioned would be permissible in built-up areas.

a (ii) With mechanical flexible joints as standard for cast-iron mains one feels a little uncertain, as the makers have not given much of a guide on the matter. My own view is that cast-iron mains with these joints should be able to be worked up to 50 lb. per sq.in., and I think that their working at this pressure should be faced in towns in mains up to 12 in. diameter if spun pipes are used, preferably of Class D for 4 in. and 6 in., and Class C for 8 in., and assuming such mains are provided with isolation valves at intervals.

With regard to steel mains, and assuming that they are in good, sound condition, pressures up to 10 lb. per sq.in. should be permissible in mains up to 12 in. diameter with welded joints in built-up areas and up to, say, 250 lb. per sq.in. in country roads away from buildings.

There is a difficulty in that most transmission mains have, near their termini, to pass through built-up areas, and in most cases it would not be possible to make a distinction.

Where steel mains are jointed by means of flexible joints, the pressure stated for spun mains should apply—50 lb. per sq.in.

General Considerations

Where high mains pressures are worked, the standard inspection and maintenance of the mains must be of a high order. I referred to this in the discussion on Mr. Escreet's Paper of 1943 on the Design of Distribution Systems to Supply Post-War Development, when I stated that a good system of trench inspection was desirable with high pressure mains systems. No matter how carefully such mains are laid and tested, interference with them may result in serious trouble. Apart from such matters as damage to the protective covering when other excavations are being made, trenches opened alongside such mains require careful attention, particularly where gas mains are undermined or their foundations weakened. Where high pressure mains are laid with flexible joints, the bends require to be anchored with concrete or by some other means to prevent their movement from the "kicking" pressure in the main. Should the opening of any excavation near the back of a bend weaken the support to the bend, the bend might blow out. The manufacturers of flexible joints might consider some self-contained arrangement embodied in the joints for harnessing or locking them. The Dresser Coupling Company, of America, make such special provision in their joints where required.

2. With regard to the maximum pressure to be operated at the inlet to consumers' meters where no service governor is fitted, I consider that this should not exceed 8 in.

Mr. **E. L. Nicholas** (Guildford): When I first went to Guildford I found there was considerable leakage in one particular part of the district. On investigation, I discovered that an old 6 in. cast iron main was working at 5 lb. pressure. The houses in the vicinity were all connected to it by services, and a governor had been installed on each service. The leakage in that district was excessive, and it was found to be very much more economical to lay a steel high-pressure main alongside the old main, to take all the governors out and run them as low-pressure services, and to put a governor between the new high-pressure main and the old cast iron main.

The 5 lb. pressure, with the joints in the old main, was certainly excessive. We reverted to the normal 6 in., and secured very much better results.

Mr. **Sayner**: What about the law of exosmosis and the poisoning of the soil as the result of the escape of gas through cast iron and other materials? Many years ago I was concerned with mains which passed through agricultural soil, and although the mains were proved to be tight, by ordinary standards at that time, the escape through the materials, which was cast iron in that case, was such that the soil was poisoned. It would be interesting to know whether any of the members have had experience of the percentage of exosmosis action due to escape, and its effect.

Mr. **Hodkinson**: On the subject of laying pipes specifically for high pressure purposes, it is most important that the trench cutting should be accurate, and that pipe laying should be carried out under the most strict supervision, because, unless you have an absolutely clean joint, especially with the mechanical joint, it is impossible to achieve the high testing pressure that we have been using on the Grid.

While I fixed the maximum working pressure at 45 lb. per sq.in. for pipes of 12 in. diameter, using the cast iron mechanical joint, I feel it would be quite safe to go up to pressures in the region of 75 lb. per sq.in. in pipes of less than 12 in. diameter.

(To be Continued)

Waverley Association of Gas Managers

Presidential Address*

of

H. ROBINSON

Engineer and Manager, Annan Gas Company

WHAT concerns us most at the moment is the nationalization programme of the Government. Throughout the Gas Industry the view is widely held that engineers and managers should not take sides, at any rate in their professional organizations, but in a country of free thinking men, differences of opinion are inevitable, and there is nothing to be gained by suppressing discussion, provided it is conducted in a careful, responsible fashion with nothing in view save the welfare of our Industry and our country.

It cannot be denied that in the recent general election the Government will given an unmistakable mandate to inaugurate a measure of definite public control of the principal public utilities. They have made a beginning with coal, and they will proceed with gas, electricity, and water. With regard to gas, therefore, it is our duty, as public servants, to give effect to whatever laws are finally enacted by the King in Parliament, but during the discussion of these laws we are certainly entitled—indeed we are bound by our consciences, as citizens and as professional men—to exert what influence we can to ensure that the new form of organization shall not impede our economic recovery nor operate to the detriment of our great Industry.

The change will be the less abrupt because the Gas Industry has always been more or less under Government control, a control which has been merely intensified during the last six years. It may indeed be questioned whether the Governmnt could not have secured by a further extension of these administrative controls as much as will be effected by a transfer of ownership.

Essentially an Economic Industry

It must be admitted that the Gas Industry has never occupied that important position in the minds of statesmen and politicians merited by its widespread and intimate influence on the amenities of domestic and industrial life, its technical achievements in the conservation of coal, and the volume of the contribution it has made, and can make, to the economic recovery which is to-day of such vital necessity. The very fact of the efficiency of its quiet and somewhat unobtrusive service has tended to obscure the fact that it distributes energy in a readily applicable form for a far less expenditure of coal and labour-force than any other form of energy production.

It is possible, however, that in Government circles there is to-day a greater appreciation of the importance of the Gas Industry in the national economy, enhanced no doubt by the superlative effort made by the Industry in the war years. Before the war, the Industry had a century-old record of efficient service, but when war came it mobilized all its resources of technical experience and knowledge, altering its methods to meet new and strange demands and keeping up the supply of a refined, readily-controllable fuel to shifting populations and rapidly expanding industries—and that in spite of air attack, of labour shortage and of a deterioration both in quantity and quality of its basic raw material, coal. It has taken two great wars to make the public realize that coal is the basis of our civilization, and that every effort will have to be made to use it to the best advantage of the community. Mr. Lyle has shown in a recent Paper that at the present time the combined over-all efficiency with which we use this irreplaceable asset is no more than 15%. On the other hand, he assesses the efficiency of the combined conversion and use of carbonized coal at 38%, and he therefore urges that the use of gas and coke should be developed to the utmost. "Posterity will never forgive us," he says, "if we go on wasting 15% of our stored capital energy."

Nationalization and Private Enterprise

It is natural that there should be strong opposition to State control on the part of industries now in private hands. Protests against the nationalization programme in general have been made by most of the industries threatened by it. The railways, road transport companies, the iron and steel, and the electrical industries, have all voiced their opposition, while this year's annual meetings of practically all the great gas companies have been marked by disapproval on the part of their chairmen of the proposed transfer of their undertakings to government ownership. The British Gas Federation itself expressed the view in its Report on Post-War Planning that nationalization would do nothing to improve the services rendered by the Industry to the community, and the Convention of Burghs was against nationalization in Scotland.

It is, however, probably too late in the day to meet the threat with direct disapproval. If the Government decides, with the approval of Parliament, to assume the ownership of the Gas Industry, it will be more to the point to consider what steps can be taken to make a success of the new organization in the interests of the public weal.

Criticism is greatly hindered by the delay in defining the Government's intentions. The present uncertainty with regard to the future structure of the Industry is inevitably having a cramping effect on plans for future development. The Gas Industry, like all the other great industries of our country, has been built up on private initiative and enterprise, whether the undertakings themselves are owned by municipalities or by private companies. And we must bear in mind, too, to what an extent progress in the gas-making process is and has been indebted to the great contracting companies such as West's Gas Improvement Company, the Woodall-Duckham Companies, Simon-Carves, Drakes, and others, specialists in carbonizing plant or one or other of the ancillary processes, who have ventured large sums in research work and trial installations to perfect the design and construction of gas-works plant. These private companies have at all times been willing to contribute their information and data, culled from practical acquaintance with gas-making all over the world, and to place it at the disposal of the individual gas engineer, whose experience is necessarily limited, in the task of selecting plant best suited to his requirements. Neither must one forget such ventures as Watson House, itself only one example of the way in which the bigger gas undertakings devote themselves to the solution of problems in the manufacture, distribution, and application of gas, placing their solutions at the disposal of the whole Industry. We must endeavour to make sure that these sources of strength, this powerful support, are not denied to us in the new organization.

Coal

Before passing to a consideration of the Heyworth Report, let us turn for a few moments to reflect upon the situation of the coal mining industry, the nationalization of which is rapidly taking statutory shape. The mining industry has still to bridge a wider margin before it is again producing coal in sufficient quantity to meet the domestic and industrial needs of the country, and a wider margin still before there will be surplus to export, if indeed export of the pre-war dimensions is ever to be resumed. Coal is more vital than money. It is imperative that for our very existence we conserve every ton we can. There is probably sufficient coal available below ground to meet our requirements for a very long time to come, provided it is utilized efficiently. And for all heating purposes there is no more efficient mode of usage than that by way of carbonization—in other words, than the gas-works process. But efficient gas-making demands something more than just the indiscriminate supply of coal. The coal itself should be that suited to the process and as far as possible, prepared for the process. Fortunately, bituminous coals form the bulk of our deposits. All such of these coals as are of gas-making quality should be reserved for gas-making. Their diversion to steam-raising or other uses in the raw state is, at this fateful time, unforgivable.

The cost of gas production has risen throughout the country during the war period, and we are still struggling with the problems entailed. This acute rise in cost is due not only to the increased cost of coal, but to a much greater extent to the fact that quality has fallen to an alarming extent with the inevitable result that gas production per ton of coal has fallen. This, and the unsuitability of much of the coal supplied, has meant that additional plant is required. Technical skill is seriously hampered by these difficulties, and there is an urgent necessity that collieries should resume their co-operation with the gas undertakings in selecting, grading, and cleaning the coal supplied for gas manufacture.

Scotland produces excellent gas-making coals, and this fuel should be reserved for gas-works use. There appears nothing to prevent it. Electricity can be generated and steam can be raised for industrial purposes by the consumption of low volatile coals which are unsuited for gas-making, at any rate by existing methods. And the use of raw coal for domestic purposes in districts within gas supply areas should be entirely replaced by gas and coke.

The coal situation, in Scotland particularly, is too serious to be regarded as a matter for passing comment. It strikes at the very root of trade recovery. We got through last winter with

* Delivered June 21.

difficulty, indeed with much less difficulty than was expected, but we have next winter to face. Shall we have sufficient coal to build up stocks this summer? Economy is necessary here and now. My belief is that even if coal production were normal, it is necessary for the distribution of coal for domestic and industrial purposes to be kept under watchful control for a number of years to come.

In 1939 Scotland produced thirty and a half million tons of coal, but this year's figure is no more than twenty-one millions. Nationalization of itself will do nothing to remedy this desperate state of things. The one man above all others who can win the post-war victory is the coal miner. This is an inescapable fact, And unless the new organization succeeds in restoring the miners' pride in his work and his concern for the general welfare of his country, it will contribute nothing to the restoration of prosperity.

The Heyworth Report

The long awaited report of the Heyworth Committee was published in December. There are two points to keep carefully in mind in discussing it. First, it is not the Draft Bill for the nationalization of the Gas Industry. The Government has still to announce its own proposals. Secondly, it is the report of a Committee set up by a Liberal member of the Coalition Government. Its members were by no means Socialists. Its Chairman was an eminent business man brought up in the traditions of private enterprise on a big scale. Having said that, we come to a third point, that the report is the considered opinion of five able men who approached the consideration of our Industry from the outside—that is to say, they are completely unbiassed by any of the controversies which have been going on within the Industry over many years.

They were not prejudiced for or against nationalization. They were asked " to advise what changes have now become necessary in order to develop and cheapen gas supplies to all types of consumers." And, broadly, they decided that it was " necessary " to recommend a form of public ownership on a regional basis. On what grounds did they arrive at the " necessity " of such a reorganization of the Industry as they recommended? From a consideration of the history of the Industry and an examination of its present structure, and—it must be supposed—from the degree of governmental control to which it is always subject, they noted two points: firstly, " that within the limits of the existing structure the Industry to-day is reasonably efficient," and, second, " that the existing structure is restrictive of further progress," the existing structure no longer suits existing conditions, and is not likely " to provide scope to meet the problems of the future." They found within the Industry itself the view that a change must be made towards larger units, and they emphatically agreed with it. They expected that grouping into larger units would reduce production costs, improve labour conditions, economize in capital charges, facilitate the planning of developments in distribution, permit further concentration on sales policy, with extension to rural areas, as well as coke grading and marketing, and facilitate the expansion of research and the application of its results to practice. Their proposals were designed " to provide a sound practical basis for their realization."

It is not necessary to recapitulate their proposals, especially as we do not know yet whether they will be adopted by the Government and embodied in their Bill. We may, however, question whether the proposed Regions, although they divide the Industry into ten roughly equal parts, are all sufficiently homogeneous in themselves " to provide a sound practical basis " for the new organization. Is there not room for two Regions in Scotland? Have the interests of the industrial concentration of the south-west anything in common with those of the north-east?

There is also to be noted in the report a curious omission, that of any defined central control over the Regional Boards. It does not appear that all the benefits expected to follow from this regional organization could not be obtained by a much larger number of more local integrations or concentrations acting under a Central Board. And such local integrations—as, for instance, were foreshadowed by the Post-War Planning Committee—could be carried out without anything like the same disturbance of ownership as that proposed by the Heyworth Committee. It will certainly be all to the good if the detailed control of the technical side of the Industry is removed from the interference of locally elected bodies who are quite unfitted to this work. Surely nothing is more ridiculous than the appointment of technical personnel or the choice of plant and apparatus being decided by vote of a popular assembly. The principal executive officer, the engineer and manager, should be solely responsible for everything of that nature. And it is also to be hoped that in any scheme of regionalization the local executive should retain his identity and his responsibilities, subject only to such overriding principles of technical development as should be determined by the best brains in the Industry. The Minister has assured us that he does not intend that the new legislation shall hand over the control and direction of the fuel industries to the Civil Service, and that he wishes them to be run by the technicians. We should be vigilant to keep this promise before him.

Out-and-out opponents of State Control have often asked, is it possible for the State to run an enterprise efficiently? The answer is usually assumed to be in the negative, and this is not a matter of politics. But such examples as the Post Office and the Inland Revenue Department show that Government Departments do not always fail. If the Gas Industry is placed firmly under some form of public ownership and control and yet left to deal with its own technical and administrative problems, I believe it can be successful, and that it will retain its present eminent position in the economy of the nation.

Of the technical recommendations of the Committee it may be said that these are generally on the right lines. That they had in mind that some measure of autonomy should be left to the individual undertaking is shown in the recommendation that each undertaking should retain the power of declaring the calorific value of the gas to be made. The limits 450 to 500 B.Th.U. which they propose to prescribe will certainly be criticized in Scotland where the properties of much of the coal available give scope for economical manufacture at 400 B.Th.U. in some districts, with a consequent saving in coal. The prescription of an upper, as well as a lower, limit for calorific value is new, and might occasion some heart searching among those few operators who keep unnecessarily high above the declared value to avoid penalties, regardless of the waste of coal involved in such practice.

The installation of governors at individual meters, however desirable, will surely be a lengthy and costly job. On the other hand, the proposed limitation of organic sulphur content to 10 grains, while as low as can be expected immediately, is not a sufficient standard as an ideal for the future. It is not until we reach a point where sulphur falls below 8 grains per 100 cu.ft. that corrosion in metal falls sharply. The ideal, of course, is 3 to 4 grains. With sulphur practically " gone," we can hope for a huge increase in the sale of gas radiators. Central heating is not within the purse of every home, but the gas radiator, supplied with sulphur-free gas, would provide background heating at short notice and at low cost.

Coke Production

Coke production is dismissed in three paragraphs, 95 to 97, but any talk about efforts on the part of the Gas Industry to improve coke quality is useless unless coals of standard quality are available. It should be obvious to anyone that the ash content of coke is rigidly determined by that of the coal from which it is made. But the question raised in paragraph 95, whether a big expansion in the demand for gas would not seriously embarrass the Industry unless there is a corresponding increase in the demand for coke, is answered in the following paragraphs. The wise adoption of a national smoke abatement (it should be smoke abolition) policy will absorb all the coke, and more, which the Gas Industry can produce.

To revert to the general question, taking into consideration all the present circumstances, I take the view that the duty falls upon us to give such help as may be in our power loyally to assist the Government in the complex and difficult task which they are about to take in hand. I am convinced that such a course will ultimately prove to be in our best interests. A tremendous task lies before the Gas Industry, and to us, the engineers and managers, at this time will fall the major responsibility for success or failure. We are all partners, and each undertaking, large or small, should co-operate in the task of rendering the most efficient gas service to the public. Progress and efficiency should be our slogan, and we should eschew partisan politics of every kind.

Dr. E. W. Smith, a man of unrivalled experience in the Industry and with the unique advantage of knowing it from every side, has recently made an important utterance on this subject. His mature advice is that we should by no means be held back in our progressive schemes by the so-called " shadow of nationalization," but that we should carry on as if nothing were happening. He was certain that those undertakings which go forward with normal developments will be pleased when the time comes for the evaluation of their assets because they will certainly be given full moral and financial credit for whatever additional value has accrued in the meantime.

Finally, we must not lose sight of the inevitable competition with other sources of heat and power. It is up to us to " mak siccar " and to put into effect as soon as we can those plans and schemes which we have in mind for the improvement and development of our own undertakings so that there shall be no waiting period when the extra demands are made. With such a policy fully and actively sustained, I have every confidence that the Gas Industry will continue to maintain the first place in the fields of domestic and industrial heating of practically every kind.

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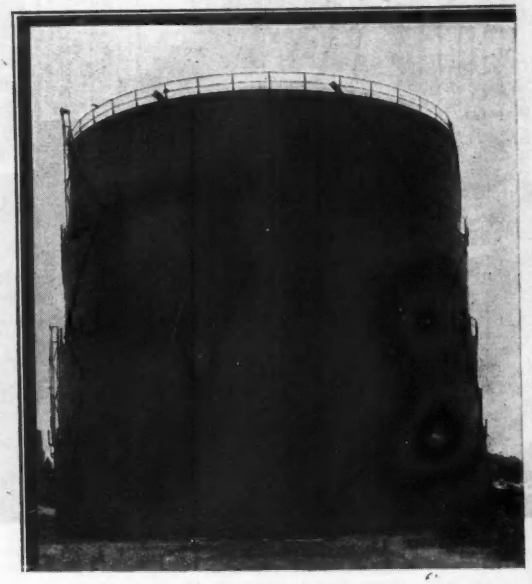

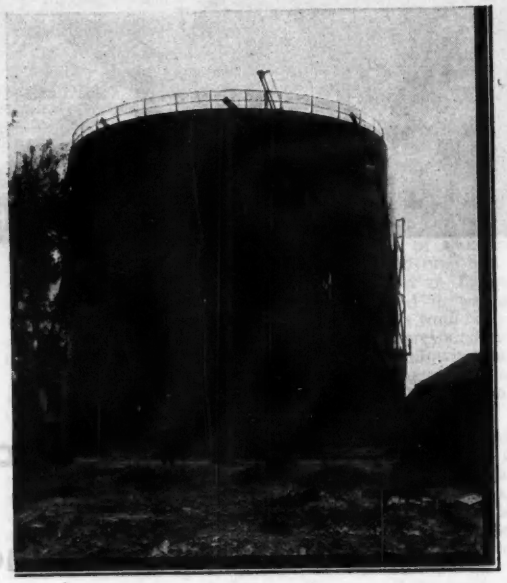

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Power Plant and Machinery for Exhausting and Boosting Gas*

By L. J. CLARK

B.E.M., B.Sc.(Eng.), A.M.I.C.E., A.M.I.Mech.E., Assistant Mechanical Engineer, Beckton Gas Works, Gas Light & Coke Company

GAS is a form of energy which can be transmitted over long distances with a high degree of efficiency. The energy consumed in the pressure raising machinery varies from about 0.03% to 0.15% of the thermal energy in the gas, depending on the distance of transmission from the carbonizing plant to the consumer. The last quarter of a century has seen a progressive rise in the energy requirements for gas distribution, and this has resulted in an ever increasing demand for efficient and economical pumping machinery. This rise may be ascribed to four main causes—*viz*:—

(*a*) The progressive development of more refined processes for wet and dry purification of gas and the introduction of new methods of direct by-product recovery, which throw additional back pressure.

(*b*) The continuous expansion of the supply area served by individual manufacturing stations, necessitating longer transmission mains and heavier loadings on existing mains, each of which results in greater resistance to be met by the gas pumping machinery.

(*c*) The tendency to concentrate gas manufacture at the larger and more efficient manufacturing stations

(*d*) A keener appreciation of the economic relationship between pumping costs and capital expenditure on mains, which tends to favour higher pressures and smaller mains, as the distance of transmission increases.

When Beckton first took its place as the world's largest gas-works, one stage of pumping, with a pressure rise of about 30 in. W.G. sufficed to convey the gas from the retort house to the consumer. To-day, however, four and five stages of pumping have become necessary with an overall pressure rise of 100-200 in. W.G. and in the case of rural districts of Essex, pressures of 45 lb./sq.in. are incurred in the fifth stage.

With such increases in pumping requirements, it is not surprising to find that the design and performance of pumping machinery have made great advances, and at the present day a wide range of such machines is available, each having its own design features and characteristics which determine its suitability for any particular duty. In this Paper, therefore, an attempt has been made to review the performance characteristics of various types of gas pumping machines, with their associated prime movers, and to indicate their most suitable applications.

Load Factors and Demand Characteristics

When any new projects for pumping plants are under consideration, particular attention should be paid to the demand characteristics and the load factor required, together with the properties of the gas to be pumped. These factors will influence the selection of the most economic pumping pressures and the type of machine and prime mover most suitable for the duty. They will also affect the balance between the number of machines and the sizes of the individual units. Space will permit only the briefest consideration of a few of these factors, under the following headings:—

Pumping Pressure.—In the first instance, the maximum initial pumping pressure must be determined. This is a matter of economic compromise between the cost of the transmission main and the cost of pumping, employing Kelvin's Law. A series of calculations based on 1939 price levels is included in an appendix, and curves are deduced showing the most economic size of main and corresponding initial pumping pressures required, for transmitting various quantities of gas over any distance up to 100 miles. In these examples, the pumping rate is assumed to be constant during the day, and it is evident from the results, that as the transmission distance becomes longer, the initial pumping pressures rise but the most economic size of main becomes smaller.

When transmission distances become very great, as in America, where natural gas is pumped for several hundred miles, it becomes most economical to provide booster stations at about every 80 miles. At these pumping stations, large gas engine driven reciprocating compressors are provided to raise the pressure from 250-300 lb. per sq.in. at the intake, to 500-575 lb. per sq.in. at the discharge. In this way, the pressures are maintained at a high level throughout the whole main, and they are only permitted to fall below the 250 lb. per sq.in. at the terminal point. The economic soundness of this system becomes quite evident from a study of the data.

Load Factor.—The load factor introduces many variables into the problem of pumping economics, and calculations become very complex, necessitating individual treatment of each problem. In general, however, it is evident that when gas has to be transmitted over several miles an overall economy is effected when sufficient storage capacity is provided at the consumers' end of the main to permit a uniform pumping rate throughout the day.

The following example for two cases, pumping the same overall quantity of gas daily, illustrates the effects of load factor upon pumping costs:—

Suppose it is necessary to pump 12 million cu.ft. per day through a 12 in. steel main 11 miles long.

In the first case, no storage is provided and the pumps have to cope with the immediate demand. In the second case, there is sufficient storage at the receiving end to permit a constant rate of pumping. In both cases, electrically driven reciprocating compressors are provided and power is charged on the usual two-part tariff for bulk supply.

If the gas supply district is typical of a normal residential area, the average hourly pumping rate over the day will be 500,000 cu.ft., while the maximum hourly rate will be more than twice this figure.*

The following table shows the comparison between the loads and running costs of the two systems. In case I the demand is estimated to be proportioned over the 24 hours in accordance with columns 2 and 3.

Applying a typical sliding scale for electrical charges:

Case 1.	Max. demand charge = £3 8s. 4d. per Kw/annum on 2,500 Kw.	=	5,630 pence/day
	Unit charge = 0.572 ·'·24,630 units	=	14,100 ,, ,,
	Total	=	19,730 ,, ,,
Case 2.	Max. demand charge = £3 8s. 9d. per Kw/annum on 881 Kw ...	=	1,990 pence/day
	Unit charge = 0.574 ·'·21,150 units	=	12,150 ,, ,,
	Total	=	14,140 ,, ,,

It is, therefore, evident that the daily power cost of Case 1 is 40% higher than Case 2. In addition, Case 1 requires compressors of twice the capacity and nearly twice the pressure, necessitating very much higher capital expenditure on the pumps. Further, the gas mains will be subject to nearly twice the pressure. Taking into account all these considerations, it is highly probable that the savings effected in Case 2 would more than offset the capital charges on new gasholder storage at the receiving end.

* Summary of Paper presented to the London & Southern District Junior Gas Association.

Case.	No. of Hours.	Rate of Flow. cu. ft./hr.	Pumping Pressure. lbs./sq. in.	Theoretical (Isothermal).		Estimated Efficiency.		Electrical.		Maximum Demand. Kw.
				H.P.	H.P. × Hrs.	Compressor.	Motor.	H.P. × Hrs.	Kw./h.	
1	2	1,000,000	110	2,130	4,160	69	90	6,700	5,000	2,500
	4	750,000	88	1,420	5,680	68·5	88	9,420	7,020	
	10	500,000	59	7,320	732	64·5	85	13,350	9,950	
	8	250,000	33·5	215	1,720	60·5	80	3,560	2,660	
					18,880			33,030	24,630	
2	24	500,000	59	732	17,600	69	90	28,300	21,150	881

* "The Design of Distribution Systems to Supply Post-War Developments," by H. J. Escreet.—*I.G.E.*, 1943.

When other forms of prime mover are used the results are generally similar to the above, although not quite so pronounced.

This example does not take account of seasonal variations in demand which cannot be smoothed out by holder storage, but if this is taken into account, the desirability of maintaining a uniform daily pumping rate becomes even more important, because the relation of the peak to the average annual load becomes much greater.

In order to illustrate the effect of load factor on a typical distribution pumping plant, graphs have been prepared which show the useful energy imparted to the gas (expressed as isothermal horse power) for the distribution boosters at Beckton. One booster showing a high Sunday peak, is feeding a large residential area, having a relatively small gasholder capacity at the terminal point. The other booster is feeding into the general trunk main system, where the large storage capacity absorbs the peak. Each of these boosters is designed to pump 2,000,000 cu.ft. per hour at 150 in. W.G. differential, which is equivalent to a gas horse power output of 655. The average gas horse power output of the machines ranges from 15% to 22% of this figure in the summer time, and from 21% to 35% in the winter time. It is, therefore, evident that great attention should be paid to load factor in the design of boosting machinery and the efficiency to be obtained at light loads should be the highest possible.

Pressure Volume Characteristics

In cases where gas is pumped along trunk mains without intermediate tapping points to district governors, it is found that the pumping pressure P varies as volume V^n. If, however, the trunk main has various tapping points along its length which have dissimilar loadings, or the main is fed from a second booster plant, it will most probably be found that the pressure volume relation no longer follows the above simple law and the pumping plant may be called upon to give high pressures with small volumes or low pressures with large volumes.

The determination of these characteristics becomes of great importance when a turbo boosting plant is envisaged as surging conditions may arise, and the effects of this will be dealt with in a later section.

There is a great difference in the governing requirements of exhausting and boosting plants. The former require inlet pressures to be governed to the highest practical degree of sensitivity—to about 1/10 in. W.G.—while boosting plants require either the outlet pressure or the volumetric throughput to be governed, but in most cases the degree of sensitivity required is not great—about 2 in. W.G. In cases, however, where more than one turbo booster is feeding a main system, fairly sensitive pressure control is required, or it may be found that one booster only, is carrying the load and the others with the lighter loaded governor will be idling.

Gas Conditions

Several factors related to the gas characteristics affect the design of exhausting and boosting plants, and some of these are summarized below:—

(*a*) The temperature and degree of humidity is of primary importance for exhauster design. A gas which is saturated at 100°F., occupies about 7½% more volume than dry gas at the same temperature, and at 150°F. the increase will be nearly 33%.

(*b*) The specific gravity of the gas is important for all forms of turbo machine as the pressure developed at any particular speed is directly proportional to the specific gravity.

(*c*) The humidity and benzole content are important if pressures above 10 lb./sq.in. are anticipated. It is probable that condensation will take place after compression, and means of cooling the gas, together with adequate drains, should be provided.

(*d*) In the case of exhausters handling foul gas, suitable tar drains should be provided.

(*e*) Special care should be taken where turbo machines are to be used for gum laden gas, as growth may occur quickly on the impellers and casing, and rubbing may eventually occur.

The remainder of the Paper deals with the features of design of the majority of exhausters, booster and compressor types, together with their individual operating characteristics and special features of application. The various forms of prime mover are dealt with, such as steam turbines and engines, gas and oil engines and electric motors, and their most suitable applications are discussed. Great emphasis is laid on the performance of both gas pumps and prime movers when operating on light loads and with a poor load factor, as by careful consideration of these points, considerable economies in power can be achieved.

DISCUSSION

Mr. **G. Dougill** (Gas Light & Coke) said the Author had rendered a very useful service by emphasizing the difference between adiabatic and isothermal horse power. The real test was the amount of compression done when the gas was cold. He had also touched helpfully on the question of oscillation and given some rather interesting observations on tracing variations in pressure between the exhauster blades.

Mr. **R. F. Twist** (South Metropolitan) said the Author had brought out very clearly the effect of the high inertia of a turbo exhauster on its ability to respond to sudden changes in gas flow. He thought it was probable that in most large gasworks a turbo exhauster would work satisfactorily. On tar fog removal Mr. Clark had given information which had not been available before. He wondered if he could say why the efficiency of removal fell as the temperature of the gas rose, and whether it was associated with the increased viscosity of the gas. He also asked whether the Author thought there was any application for the control of the output of air fans or blowers by means of variable inlet vanes in the case of blowers on water gas plants.

Mr. **C. A. Deas** (Tottenham), referring to the effect of load factor on cost of power, said that where they had a nice steady boosting load he was prepared to agree that steam was cheaper, but in the case of a heavy intermittent load a better case could be made out for gas or oil engines on the works. A diesel electric set appealed to him, but there was a high capital cost. On the question of safety, he suggested the use of properly designed flame proof motors.

Mr. **Canning** (Gas Light & Coke) asked if any figures were available for loss of calorific value according to the extent of compression. There must be differences due to variations of load on the boiler house if boosting was not always constant.

Dr. **A. E. Haffner** (Gas Light & Coke) asked if there had been any progress in the suppression of noise from turbo blowers.

Mr. **J. H. Bradley** (Gas Light & Coke) said Mr. Clark was quite right in stressing the importance of load factor. In order to be absolutely safe they tended to put in machines which were far too big for their job and thereby wasted power for a big percentage of the time they were running. One load factor over which they had no control was the Sunday lunch time load, but he did not think the Author had said as much as he might have done as to what gas engineers, as distinct from mechanical engineers, might do to keep up their load factor.

Mr. **Clark,** replying to the discussion, welcomed Mr. Dougill's comment on efficiency. A lot of misunderstanding had arisen through people talking about adiabatic efficiency, isothermal efficiency, volumetric efficiency, mechanical efficiency, &c., and in some cases he had seen compressors described as having efficiencies of 90%. These turned out to be volumetric efficiencies, which had little bearing on running conditions. In answer to Mr. Twist, there was a publication pending dealing very fully with tar fog removal to which reference should be made. He thought the system of variable inlet vanes could be applied very satisfactorily to blowers on water gas plants. Mr. Deas had raised the question of boiler house efficiencies. He had been careful to say that the figures quoted applied to Beckton; steam costs might rise considerably in other works. At Beckton the boiler plant served many consumers and it was undoubtedly the diversity of the various loads which brought the demands on the boiler plant to something reasonably steady. On the other hand, steam did not cost such a tremendous amount even if the boiler plant was subject to variations, as the capital cost was not a very big proportion of the total steam cost. The biggest item was the fuel charge, and with efficient mechanically stoked boilers it was possible to reduce the output considerably and still maintain a reasonable efficiency. The Sunday dinner time pumping problem was, he agreed, not a case for steam. With regard to the capital cost of diesel electric plants he had shown curves indicating the relation of capital charge to fuel charge. It was quite a small proportion so that even if they stepped up the capital charge by 50% they would not put more than about 5% on to the all-in cost. As to safety precautions and flame proof motors, the question might be asked what was a flame proof motor. Theoretically there was not such a thing at the moment. Coal gas was a group 3 gas and so far it had not been possible to get a certificate covering a flame proof motor for that group. In answer to Mr. Canning, loss of calorific value depended on the proportion of hydro-carbons present in the gas, benzole content, &c. During the winter period they had had to shut down their benzole plant in order to make more gas, and in effect they found they were turning their high pressure compressors into benzole extractors, and of course in that case the gas was subject to slight reduction of calorific value. Dr. Haffner had referred to the question of noise. He had recently seen an interesting experiment on a sewage installation at Manchester where the noise from turbo blowers, normally heard a long way off, had been eliminated by the use of Burgess Silencers. Mr. Bradley had referred to low load factor. Many instances could be given, but so long as the question of load factor was borne in mind when new plant was being considered and the designer was not tied by numerous impracticable conditions which would lead to an inefficient machine, such as the steam turbine, which must be capable of developing full power with half the normal steam pressure and the condenser out of action so that steam had to be exhausted to atmosphere, he thought they would get the right machine for the job.

On the proposition of Mr. **E. O. Rose** (Tottenham), seconded by Mr. **Saville** (Wandsworth), a vote of thanks was accorded to Mr. Clark, who briefly replied.

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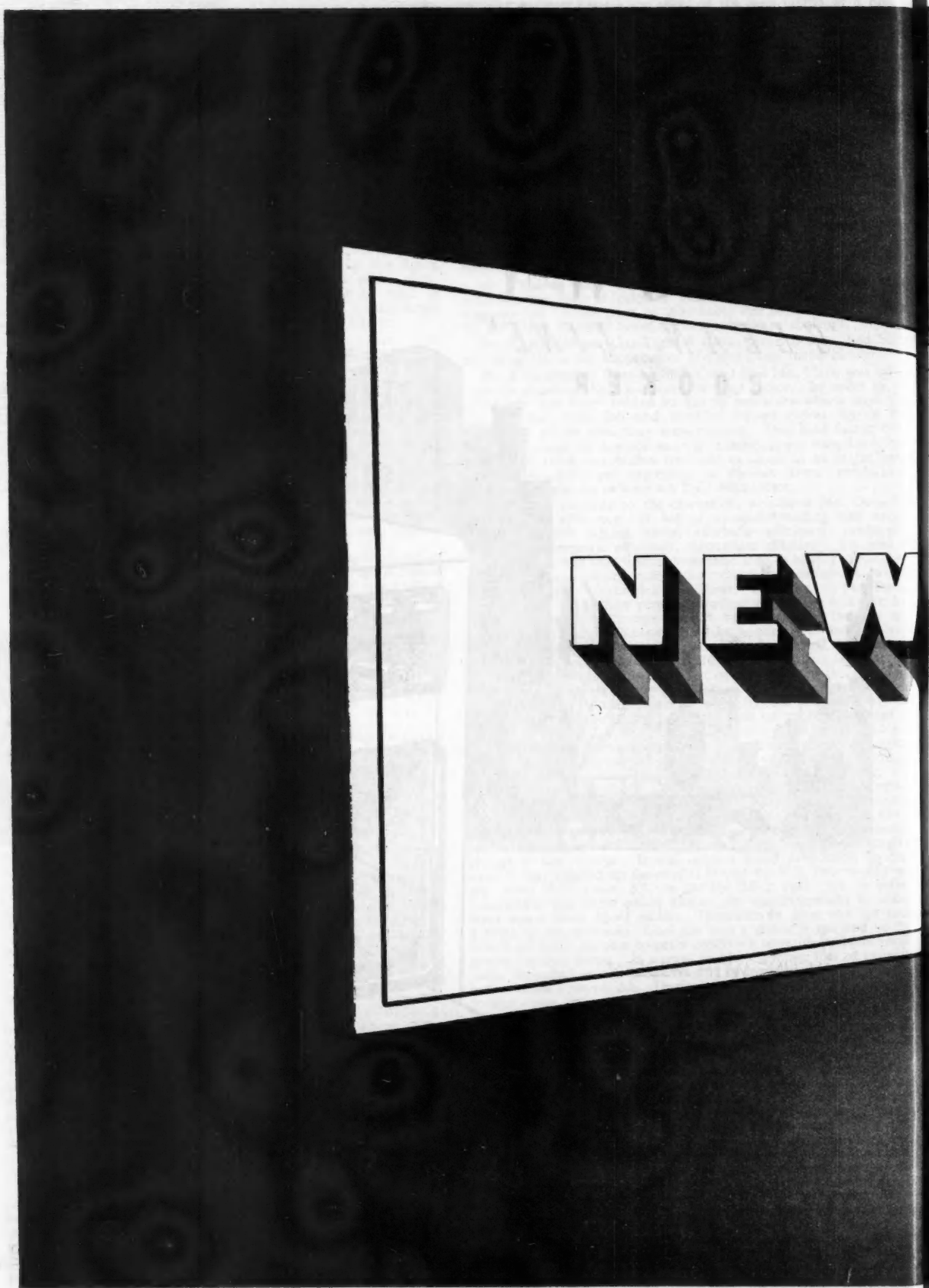
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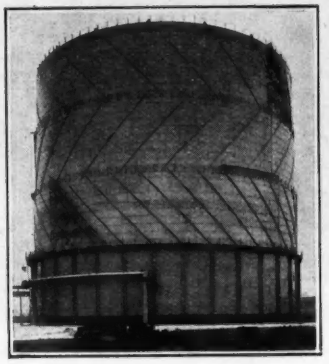

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COMPANY MEETING

Bombay Gas Company

The Ordinary General Meeting of the Bombay Gas Company was held at the Registered Office, Gresham House, Old Broad Street, London, E.C.2, on June 26. Mr. STANLEY HUNTER JONES (Chairman of the Company) presided.

The SECRETARY read the notice convening the meeting, and also the Auditors' Reports.

The CHAIRMAN: I assume that as usual the Accounts will be taken as read. When we met a year ago I said I hoped that the increase in the sale of gas then recorded would largely continue after the war, as was also the opinion of our Engineer and General Manager, and that has been very much the case, and had we sufficient gas-making capacity I venture to think that there would possibly have been no decrease at all, the actual decrease in sale of gas being only 0.89%. One of the explanations is that I understand the population of Bombay, which before the war was about one million people, is now something like double that figure. One matter is of great satisfaction to your Board, and that is that during the period of the war we have not had to increase the price of gas, although everything else seems to have become much more expensive, and the reason for our being able to avoid an increase in the price is the Company's very low capital cost per million cu.ft. of gas. Whether we shall be able to continue for long to supply at the present price I cannot say, as we are faced with increased costs in all directions, but personally, being of an optimistic temperament, I live in hope that we shall be able to do so, as the abolition of Excess Profits Tax may help us somewhat, although until the Chancellor of the Exchequer reveals his intention in regard to a substituted tax we cannot rely on this, and also because we are served by a very good staff of Officers and men to whom we must all be very thankful.

Although the year under review is not, I am happy to say, affected by the recent Indian Naval riots, which caused so much damage in Bombay, there was some damage to the Company's property, a large number of street lamps having been damaged or destroyed, many of which, however, have been and are being repaired. The capital expended per million cu.ft. of gas sold works out for the year at £374, and on the capital issued at £298, a source of satisfaction to us all.

Turning to the Accounts, the total expenditure on revenue account shows an increase of £32,824, due mainly to increases in the cost of coal and wages, the former accounting for £24,962 of this sum. An increase in the total revenue, however, of £24,536, due mainly to coke, reduces the reduction of working profit to only £8,288. In the net revenue account you will see that after adding the working balance of £115,746 to the amount brought forward of £4,606, and the interest received from investments of £1,781, we arrive at a figure of £122,133. After charging against this sum income tax and excess profits, £70,398, and allocating £10,000 to the renewal and contingency fund and meting the interim dividend paid in November last, as well as one or two small items, there remains £31,275, out of which your Directors recommend a final dividend of 6½%, less income tax at 9s. in the pound, which will leave £20,550 to be carried forward, against £4,606.

The Directors have explained in their report the reason for raising the rate of dividend and the deduction of tax at the standard rate instead of at a rate from which the rate of Dominion Income Tax Relief has been deducted and passed on to the stockholders. The ultimate net result to the stockholders is, however, much the same as heretofore, being a slight increase of 4s.%. The balance sheet does not seem to call for any comment, and the same remark applies to the capital account. That is all I need say in regard to the Accounts.

As to the future, one cannot prophesy nowadays, but given normal conditions and additional plant there is not the slightest doubt but that the Company has a good future, grounded on the fact that in ten years we have doubled in size. Our Bombay European staff require a well-earned rest in this country after so many years in the East without furlough. We have recently sent out three new young officials to take the places of those who are no longer with us and we are hoping that soon all the old staff will be coming home on leave. Our General Manager and Engineer in Bombay, Mr. L. W. Boulter, was hoping to leave for England shortly, but owing to the serious illness of the Commercial Manager and Accountant, Mr. R. A. Macdonald, the former may have to postpone his leave for a while. We shall particularly welcome him as we have many important matters which we should like to discuss personally with him.

There is one matter before I conclude my remarks which I am sure you would wish me to refer to, viz., the honour conferred by H.M. the King on a member of the Board—Sir George Evetts, to whom I am sure you will all wish to offer your warmest congratulations on the honour of Knighthood conferred on him for the self-sacrificing and unpaid work he has done during the war for his country in Government service. Sir George is one of the hardest and most thoroughly efficient workers it is my privilege to know. The help he gives to the Board is simply splendid. He was, if I may say so, trained under my late father, Mr. Henry Edward Jones, himself a real worker. I will now move: "That the Report of the Directors and the Audited Statement of Accounts for the year ended Dec. 31, 1945, presented to the meeting, be, and the same are hereby received, approved, and adopted."

Mr. ARTHUR M. PADDON (Deputy-Chairman) seconded.

There being no questions, the motion was put to the meeting and carried unanimously.

The CHAIRMAN then proposed: "That a final dividend for the year ended Dec. 31, 1945, of 6½% (less income tax at 9s. in the £) be now declared payable on and after July 1, 1946, making, with the interim dividend of 3½% (less income tax at 5s. in the £), a dividend for the year of 10% (less income tax at an average of 7s. 7.2d. in the £)."

Mr. ARTHUR M. PADDON seconded, and the resolution was carried unanimously.

The CHAIRMAN said it was now his pleasant duty to propose: "That the retiring Directors, Mr. Arthur Matthews Paddon and Mr. Basil Murton Gill, being eligible and offering themselves for re-election, be hereby re-elected accordingly."

Sir GEORGE EVETTS seconded, and the motion was carried unanimously. Mr. Paddon briefly returned thanks.

Mr. S. F. FIELD moved: "That Mr. Alfred Morland, F.C.A., and Mr. Frederick John Bradfield, F.C.I.S., be reappointed Auditors for the ensuing year at the same remuneration as heretofore."

Commander R. H. GLEN seconded, and the motion was carried unanimously, Mr. BRADFIELD briefly returning thanks.

The CHAIRMAN, proposing a vote of thanks to the European and Indian staffs of the Company in Bombay and the Secretary and staff in London, said the stockholders would have gathered from his earlier remarks some idea of the tiring and gruelling time the staffs in India had undergone. It was something like eight or nine years since many of them had had any leave. They were getting very run down, and that was a source of anxiety to them. Mr. Macdonald, their most efficient Accountant, had had a serious illness, but had pulled through, and Mr. Boulter, who had the calamity of losing his wife not long ago, was sorely tried with many difficulties at the present time. Times had not been easy in India, but the staff had backed them up loyally. They had the pleasure of seeing one of them at home recently in the person of Mr. Petts, whose services they shared with the Oriental Gas Company, who, well seasoned and accustomed to the climate, was renewing his agreement with the Company. He could not speak too highly of the way all the staff had carried on with all the political and other difficulties facing them at present. He was glad to know that the three young men they had sent out seemed to be settling down well, and he hoped they would ease the burden of their colleagues. With regard to the London staff, they were grateful to their faithful Secretary, Mr. Comber, and his assistant, Mr. Bush. They had also been glad to welcome back to the office after six years in the Forces, Mr. Broom, and he would also include Miss Cox in his expression of thanks. He could not speak too highly of the excellent work they did.

Mr. ARTHUR M. PADDON seconded, and endorsed the Chairman's tribute to every member of the staff.

The SECRETARY (Mr. Comber), replying to the vote of thanks, said they all tried to do their best, and without the help of all the staff it would not have been possible to carry on.

Commander R. H. GLEN moved a vote of thanks to the Chairman and Directors for their services during the past year. They all knew that times were difficult, and although very few stockholders were present in person, they would join in spirit in expressing gratitude for the figures the Board had put before them. The fact that there had been no questions was an expression of their satisfaction.

Mr. F. J. BRADFIELD seconded, and the motion was carried.

The CHAIRMAN said the vote of thanks was greatly appreciated.

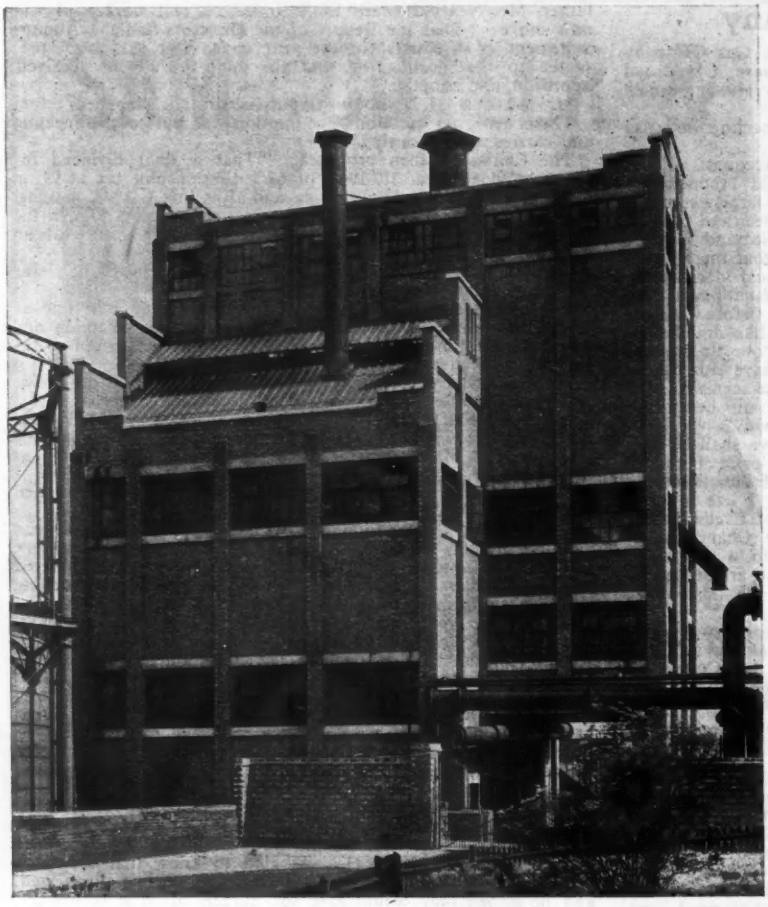
Extraordinary General Meeting

Immediately after the Ordinary Meeting an Extraordinary General Meeting was held, Mr. S. H. JONES, the Chairman, again presiding. The Secretary read the notice convening the meeting.

Mr. BLYTH, the Company's Solicitor, explained that every certificate issued by the Company had to be signed by a Director and the Secretary, and that practice had, in fact, been followed for years. A habit had grown up in some companies of using a rubber stamp or other means for signing such documents, and the Committee of the Stock Exchange had requested them so to amend their Articles as to ensure that all signatures should be in handwriting.

The CHAIRMAN proposed: "That Article No. 14 of the Articles of Association be amended by the insertion of the word 'autographically' in line No. 2 between the words 'and' and 'signed'."

Mr. ARTHUR M. PADDON seconded the resolution, which was carried unanimously.



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GAS PRODUCTS PRICES

The London Market July 1.

The prices of Coal Tar Products are unchanged. The following are controlled by Government Orders :—

Crude anthracene, 10d. per unit delivered to dyestuffs manufacturers and 9d. per unit in other cases, for material of which delivery is taken elsewhere than at sellers' premises. Unrefined crude anthracene, 15%-16%, £9 2s. per ton ; 35%-40%, £26 14s. per ton, free on rail at sellers' works.

The Provinces July 1.

Average prices of gas-works products: Pitch, 70s. per ton; toluole, naked, North, 90's, 2s. 4d. to 2s. 6½d. per gallon; pure, 3s. 2½d. Prices for carbolic acid 60's, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil are controlled by S. R. & O. 1943, 1538, and for naphthalene by S. R. & O. 1944, 1051. Prices for road tar were increased by a half-penny per gallon by S. R. & O. 1945, 229, under which Order there was also an increase of 5s. per ton in the price for standard creosote-pitch mixture.

The bulk of the pitch produced in this country is required for home trade purposes, but certain quantities are being sent at higher prices to Allied countries with the approval of the Coal Tar Control. So far as creosote is concerned the bulk is required for essential purposes, at controlled prices. With regard to hydrocarbon oils, the prices remain fixed, although there is more freedom than was previously the case.

Scotland June 29.

Deliveries are being speeded up to allow for the approaching holidays. Refined tar*: Yield to the distiller is 5d. per gallon, *ex* Works, naked. Creosote oil: Timber preserving quality,* 5½d. to 6½d. per gallon; hydrogenation oil,* 5½d. per gallon; low gravity or virgin oil,† 7½d. to 7½d. per gallon; benzol absorbing oil,* 6½d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon, *ex* Works, naked, according to quality. Crude naphtha† is 7d. to 8d. per gallon. Solvent naphtha*: Basic maximum prices delivered in bulk, 90/160 grade, 2s. 10d. per gallon, and 90/190 Heavy naphtha, Unrectified, 2s. 0½d. per gallon; Rectified, 2s. 4d. per gallon. Pyridine† 90/160 grade, 13s. per gallon; and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

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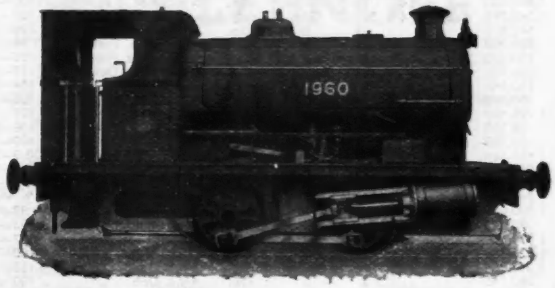

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Gas Conditions

Several factors related to the gas characteristics affect the design of exhausting and boosting plants, and some of these are summarized below:—

(*a*) The temperature and degree of humidity is of primary importance for exhauster design. A gas which is saturated at 100°F., occupies about 7½% more volume than dry gas at the same temperature, and at 150°F. the increase will be nearly 33%.

(*b*) The specific gravity of the gas is important for all forms of turbo machine as the pressure developed at any particular speed is directly proportional to the specific gravity.

(*c*) The humidity and benzole content are important if pressures above 10 lb./sq.in. are anticipated. It is probable that condensation will take place after compression, and means of cooling the gas, together with adequate drains, should be provided.

(*d*) In the case of exhausters handling foul gas, suitable tar drains should be provided.

(*e*) Special care should be taken where turbo machines are to be used for gum laden gas, as growth may occur quickly on the impellers and casing, and rubbing may eventually occur.

The remainder of the Paper deals with the features of design of the majority of exhausters, booster and compressor types, together with their individual operating characteristics and special features of application. The various forms of prime mover are dealt with, such as steam turbines and engines, gas and oil engines and electric motors, and their most suitable applications are discussed. Great emphasis is laid on the performance of both gas pumps and prime movers when operating on light loads and with a poor load factor, as by careful consideration of these points, considerable economies in power can be achieved.

DISCUSSION

Mr. **G. Dougill** (Gas Light & Coke) said the Author had rendered a very useful service by emphasizing the difference between adiabatic and isothermal horse power. The real test was the amount of compression done when the gas was cold. He had also touched helpfully on the question of oscillation and given some rather interesting observations on tracing variations in pressure between the exhauster blades.

Mr. **R. F. Twist** (South Metropolitan) said the Author had brought out very clearly the effect of the high inertia of a turbo exhauster on its ability to respond to sudden changes in gas flow. He thought it was probable that in most large gasworks a turbo exhauster would work satisfactorily. On tar fog removal Mr. Clark had given information which had not been available before. He wondered if he could say why the efficiency of removal fell as the temperature of the gas rose, and whether it was associated with the increased viscosity of the gas. He also asked whether the Author thought there was any application for the control of the output of air fans or blowers by means of variable inlet vanes in the case of blowers on water gas plants.

Mr. **C. A. Deas** (Tottenham), referring to the effect of load factor on cost of power, said that where they had a nice steady boosting load he was prepared to agree that steam was cheaper, but in the case of a heavy intermittent load a better case could be made out for gas or oil engines on the works. A diesel electric set appealed to him, but there was a high capital cost. On the question of safety, he suggested the use of properly designed flame proof motors.

Mr. **Canning** (Gas Light & Coke) asked if any figures were available for loss of calorific value according to the extent of compression. There must be differences due to variations of load on the boiler house if boosting was not always constant.

Dr. **A. E. Haffner** (Gas Light & Coke) asked if there had been any progress in the suppression of noise from turbo blowers.

Mr. **J. H. Bradley** (Gas Light & Coke) said Mr. Clark was quite right in stressing the importance of load factor. In order to be absolutely safe they tended to put in machines which were far too big for their job and thereby wasted power for a big percentage of the time they were running. One load factor over which they had no control was the Sunday lunch time load, but he did not think the Author had said as much as he might have done as to what gas engineers, as distinct from mechanical engineers, might do to keep up their load factor.

Mr. **Clark,** replying to the discussion, welcomed Mr. Dougill's comment on efficiency. A lot of misunderstanding had arisen through people talking about adiabatic efficiency, isothermal efficiency, volumetric efficiency, mechanical efficiency, &c., and in some cases he had seen compressors described as having efficiencies of 90%. These turned out to be volumetric efficiencies, which had little bearing on running conditions. In answer to Mr. Twist, there was a publication pending dealing very fully with tar fog removal to which reference should be made. He thought the system of variable inlet vanes could be applied very satisfactorily to blowers on water gas plants. Mr. Deas had raised the question of boiler house efficiencies. He had been careful to say that the figures quoted applied to Beckton; steam costs might rise considerably in other works. At Beckton the boiler plant served many consumers and it was undoubtedly the diversity of the various loads which brought the demands on the boiler plant to something reasonably steady. On the other hand, steam did not cost such a tremendous amount even if the boiler plant was subject to variations, as the capital cost was not a very big proportion of the total steam cost. The biggest item was the fuel charge, and with efficient mechanically stoked boilers it was possible to reduce the output considerably and still maintain a reasonable efficiency. The Sunday dinner time pumping problem was, he agreed, not a case for steam. With regard to the capital cost of diesel electric plants he had shown curves indicating the relation of capital charge to fuel charge. It was quite a small proportion so that even if they stepped up the capital charge by 50% they would not put more than about 5% on to the all-in cost. As to safety precautions and flame proof motors, the question might be asked what was a flame proof motor. Theoretically there was not such a thing at the moment. Coal gas was a group 3 gas and so far it had not been possible to get a certificate covering a flame proof motor for that group. In answer to Mr. Canning, loss of calorific value depended on the proportion of hydro-carbons present in the gas, benzole content, &c. During the winter period they had had to shut down their benzole plant in order to make more gas, and in effect they found they were turning their high pressure compressors into benzole extractors, and of course in that case the gas was subject to slight reduction of calorific value. Dr. Haffner had referred to the question of noise. He had recently seen an interesting experiment on a sewage installation at Manchester where the noise from turbo blowers, normally heard a long way off, had been eliminated by the use of Burgess Silencers. Mr. Bradley had referred to low load factor. Many instances could be given, but so long as the question of load factor was borne in mind when new plant was being considered and the designer was not tied by numerous impracticable conditions which would lead to an inefficient machine, such as the steam turbine, which must be capable of developing full power with half the normal steam pressure and the condenser out of action so that steam had to be exhausted to atmosphere, he thought they would get the right machine for the job.

On the proposition of Mr. **E. O. Rose** (Tottenham), seconded by Mr. **Saville** (Wandsworth), a vote of thanks was accorded to Mr. Clark, who briefly replied.

COMPANY MEETING

Bombay Gas Company

The Ordinary General Meeting of the Bombay Gas Company was held at the Registered Office, Gresham House, Old Broad Street, London, E.C.2, on June 26. Mr. STANLEY HUNTER JONES (Chairman of the Company) presided.

The SECRETARY read the notice convening the meeting, and also the Auditors' Reports.

The CHAIRMAN: I assume that as usual the Accounts will be taken as read. When we met a year ago I said I hoped that the increase in the sale of gas then recorded would largely continue after the war, as was also the opinion of our Engineer and General Manager, and that has been very much the case, and had we sufficient gas-making capacity I venture to think that there would possibly have been no decrease at all, the actual decrease in sale of gas being only 0.89%. One of the explanations is that I understand the population of Bombay, which before the war was about one million people, is now something like double that figure. One matter is of great satisfaction to your Board, and that is that during the period of the war we have not had to increase the price of gas, although everything else seems to have become much more expensive, and the reason for our being able to avoid an increase in the price is the Company's very low capital cost per million cu.ft. of gas. Whether we shall be able to continue for long to supply at the present price I cannot say, as we are faced with increased costs in all directions, but personally, being of an optimistic temperament, I live in hope that we shall be able to do so, as the abolition of Excess Profits Tax may help us somewhat, although until the Chancellor of the Exchequer reveals his intention in regard to a substituted tax we cannot rely on this, and also because we are served by a very good staff of Officers and men to whom we must all be very thankful.

Although the year under review is not, I am happy to say, affected by the recent Indian Naval riots, which caused so much damage in Bombay, there was some damage to the Company's property, a large number of street lamps having been damaged or destroyed, many of which, however, have been and are being repaired. The capital expended per million cu.ft. of gas sold works out for the year at £374, and on the capital issued at £298, a source of satisfaction to us all.

Turning to the Accounts, the total expenditure on revenue account shows an increase of £32,824, due mainly to increases in the cost of coal and wages, the former accounting for £24,962 of this sum. An increase in the total revenue, however, of £24,536, due mainly to coke, reduces the reduction of working profit to only £8,288. In the net revenue account you will see that after adding the working balance of £115,746 to the amount brought forward of £4,606, and the interest received from investments of £1,781, we arrive at a figure of £122,133. After charging against this sum income tax and excess profits, £70,398, and allocating £10,000 to the renewal and contingency fund and meting the interim dividend paid in November last, as well as one or two small items, there remains £31,275, out of which your Directors recommend a final dividend of 6½%, less income tax at 9s. in the pound, which will leave £20,550 to be carried forward. against £4,606.

The Directors have explained in their report the reason for raising the rate of dividend and the deduction of tax at the standard rate instead of at a rate from which the rate of Dominion Income Tax Relief has been deducted and passed on to the stockholders. The ultimate net result to the stockholders is, however, much the same as heretofore, being a slight increase of 4s.%. The balance sheet does not seem to call for any comment, and the same remark applies to the capital account. That is all I need say in regard to the Accounts.

As to the future, one cannot prophesy nowadays, but given normal conditions and additional plant there is not the slightest doubt but that the Company has a good future, grounded on the fact that in ten years we have doubled in size. Our Bombay European staff require a well-earned rest in this country after so many years in the East without furlough. We have recently sent out three new young officials to take the places of those who are no longer with us and we are hoping that soon all the old staff will be coming home on leave. Our General Manager and Engineer in Bombay, Mr. L. W. Boulter, was hoping to leave for England shortly, but owing to the serious illness of the Commercial Manager and Accountant, Mr. R. A. Macdonald, the former may have to postpone his leave for a while. We shall particularly welcome him as we have many important matters which we should like to discuss personally with him.

There is one matter before I conclude my remarks which I am sure you would wish me to refer to, viz., the honour conferred by H.M. the King on a member of the Board—Sir George Evetts, to whom I am sure you will all wish to offer your warmest congratulations on the honour of Knighthood conferred on him for the self-sacrificing and unpaid work he has done during the war for his country in Government service. Sir George is one of the hardest and most thoroughly efficient workers it is my privilege to know. The help he gives to the Board is simply splendid. He was, if I may say so, trained under my late father, Mr. Henry Edward Jones, himself a real worker. I will now move: "That the Report of the Directors and the Audited Statement of Accounts for the year ended Dec. 31, 1945, presented to the meeting, be, and the same are hereby received, approved, and adopted."

Mr. ARTHUR M. PADDON (Deputy-Chairman) seconded.

There being no questions, the motion was put to the meeting and carried unanimously.

The CHAIRMAN then proposed: "That a final dividend for the year ended Dec. 31, 1945, of 6½% (less income tax at 9s. in the £) be now declared payable on and after July 1, 1946, making, with the interim dividend of 3½% (less income tax at 5s. in the £), a dividend for the year of 10% (less income tax at an average of 7s. 7.2d. in the £)."

Mr. ARTHUR M. PADDON seconded, and the resolution was carried unanimously.

The CHAIRMAN said it was now his pleasant duty to propose: "That the retiring Directors, Mr. Arthur Matthews Paddon and Mr. Basil Murton Gill, being eligible and offering themselves for re-election, be hereby re-elected accordingly."

Sir GEORGE EVETTS seconded, and the motion was carried unanimously. Mr. Paddon briefly returned thanks.

Mr. S. F. FIELD moved: "That Mr. Alfred Morland, F.C.A., and Mr. Frederick John Bradfield, F.C.I.S., be reappointed Auditors for the ensuing year at the same remuneration as heretofore."

Commander R. H. GLEN seconded, and the motion was carried unanimously, Mr. BRADFIELD briefly returning thanks.

The CHAIRMAN, proposing a vote of thanks to the European and Indian staffs of the Company in Bombay and the Secretary and staff in London, said the stockholders would have gathered from his earlier remarks some idea of the tiring and gruelling time the staffs in India had undergone. It was something like eight or nine years since many of them had had any leave. They were getting very run down, and that was a source of anxiety to them. Mr. Macdonald, their most efficient Accountant, had had a serious illness, but had pulled through, and Mr. Boul[illegible] who had the calamity of losing his wife not long ago, was sorely tried with many difficulties at the present time. Times had not been easy in India, but the staff had backed them up loyally. They had the pleasure of seeing one of them at home recently in the person of Mr. Petts, whose services they shared with the Oriental Gas Company, who, well seasoned and accustomed to the climate, was renewing his agreement with the Company. He could not speak too highly of the way all the staff had carried on with all the political and other difficulties facing them at present. He was glad to know that the three young men they had sent out seemed to be settling down well, and he hoped they would ease the burden of their colleagues. With regard to the London staff, they were grateful to their faithful Secretary, Mr. Comber, and his assistant, Mr. Bush. They had also been glad to welcome back to the office after six years in the Forces, Mr. Broom, and he would also include Miss Cox in his expression of thanks. He could not speak too highly of the excellent work they did.

Mr. ARTHUR M. PADDON seconded, and endorsed the Chairman's tribute to every member of the staff.

The SECRETARY (Mr. Comber), replying to the vote of thanks, said they all tried to do their best, and without the help of all the staff it would not have been possible to carry on.

Commander R. H. GLEN moved a vote of thanks to the Chairman and Directors for their services during the past year. They all knew that times were difficult, and although very few stockholders were present in person, they would join in spirit in expressing gratitude for the figures the Board had put before them. The fact that there had been no questions was an expression of their satisfaction.

Mr. F. J. BRADFIELD seconded, and the motion was carried.

The CHAIRMAN said the vote of thanks was greatly appreciated.

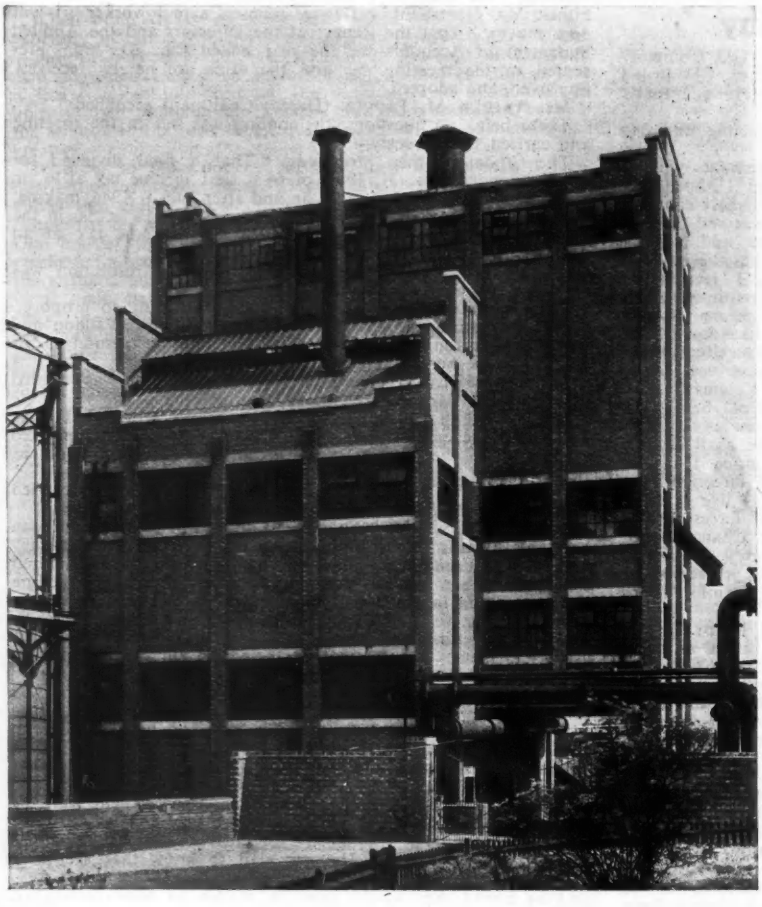
Extraordinary General Meeting

Immediately after the Ordinary Meeting an Extraordinary General Meeting was held, Mr. S. H. JONES, the Chairman, again presiding. The Secretary read the notice convening the meeting.

Mr. BLYTH, the Company's Solicitor, explained that every certificate issued by the Company had to be signed by a Director and the Secretary, and that practice had, in fact, been followed for years. A habit had grown up in some companies of using a rubber stamp or other means for signing such documents, and the Committee of the Stock Exchange had requested them so to amend their Articles as to ensure that all signatures should be in handwriting.

The CHAIRMAN proposed: "That Article No. 14 of the Articles of Association be amended by the insertion of the word 'autographically' in line No. 2 between the words 'and' and 'signed'."

Mr. ARTHUR M. PADDON seconded the resolution, which was carried unanimously.



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ARCHITECTURAL FEATURES

From the layman's point of view, perhaps the most interesting feature is the attempt to produce in an essentially industrial building a pleasing architectural appearance. The steel frame-work of the building has been encased in brickwork, and the coal-receiving annexe and coke hoppers are built as integral features of the main building. A liberal use has been made of steel-framed windows for producing maximum natural lighting and ventilation. Parapets with "Snowcrete" coping form a pleasing finish to the skyline. Rain-water pipes are not visible, being taken down internally. The full effect of the building when viewed from Desborough Road is masked to some extent by the abutment of the old horizontal retort house, but when this is dismantled and the new retort house extended it will appear as an independent and symmetrically designed structure.

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GAS PRODUCTS PRICES

The London Market July 1.

The prices of Coal Tar Products are unchanged. The following are controlled by Government Orders :—

Crude anthracene, 10d. per unit delivered to dyestuffs manufacturers and 9d. per unit in other cases, for material of which delivery is taken elsewhere than at sellers' premises. Unrefined crude anthracene, 15%-16%, £9 2s. per ton ; 35%-40%, £26 14s. per ton, free on rail at sellers' works.

The Provinces July 1.

Average prices of gas-works products: Pitch, 70s. per ton; toluole, naked, North, 90's, 2s. 4d. to 2s. 6¾d. per gallon; pure, 3s. 2¼d. Prices for carbolic acid 60's, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil are controlled by S. R. & O. 1943, 1538, and for naphthalene by S. R. & O. 1944, 1051. Prices for road tar were increased by a half-penny per gallon by S. R. & O. 1945, 229, under which Order there was also an increase of 5s. per ton in the price for standard creosote-pitch mixture.

The bulk of the pitch produced in this country is required for home trade purposes, but certain quantities are being sent at higher prices to Allied countries with the approval of the Coal Tar Control. So far as creosote is concerned the bulk is required for essential purposes, at controlled prices. With regard to hydrocarbon oils, the prices remain fixed, although there is more freedom than was previously the case.

Scotland June 29.

Deliveries are being speeded up to allow for the approaching holidays. Refined tar*: Yield to the distiller is 5d. per gallon, *ex* Works, naked. Creosote oil: Timber preserving quality,* 5½d. to 6½d. per gallon; hydrogenation oil,* 5⅞d. per gallon; low gravity or virgin oil,† 7½d. to 7½d. per gallon; benzol absorbing oil,* 6½d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon, *ex* Works, naked, according to quality. Crude naphtha† is 7d. to 8d. per gallon. Solvent naphtha*: Basic maximum prices delivered in bulk, 90/160 grade, 2s. 10d. per gallon, and 90/190 Heavy naphtha, Unrectified, 2s. 0½d. per gallon; Rectified, 2s. 4d. per gallon. Pyridine† 90/160 grade, 13s. per gallon; and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

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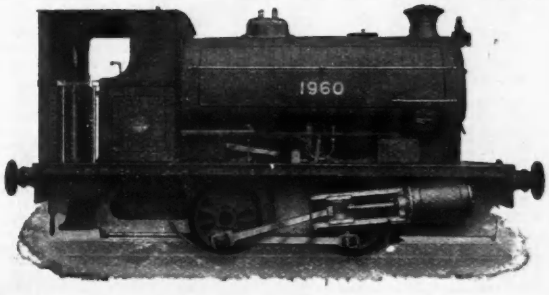
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